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THE PHILOSOPHICAL TRANSACTIONS AND COLLECTIONS

To the End of the Year M.DCC.

ABRIDGED and DISPOSED UNDER GENERAL HEADS.

VOL. III. In Two Parts.

The Firſt Containing all the

Anatomical, Medical and *Chymical*;

And the Second all the

Philological and *Miſcellaneous* PAPERS.

By *JOHN LOWTHORP*, M. A. and F. R. S.

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To the Right Honourable

ROBERT HARLEY, Eſq;

ONE OF

Her Majeſty's

Principal Secretaries of State, *&c.*

THESE

Medical and *Philological* PAPERS,

ABRIDGED and DISPOSED under

GENERAL HEADS,

Are moſt humbly

Dedicated by

JOHN LOWTHORP.

THE
Anatomical, *Medical*, and *Chymical Papers*,
PUBLISHED and DISPERSED in the
Philoſophical Tranſactions
AND
COLLECTIONS,
ABRIDGED, and DISPOSED under
GENERAL HEADS.

CHAP. I.

ANATOMY. PHYSICK.

The Structure, External Parts, and common Teguments, of Human Bodies.

I. 1. EDMUND MALLONE (born at *Port Leiceſter* in *Ireland*, and ſhewn at *Oxford* 1684, being then 19 Years old) was 7 Foot 6 Inches high; his Finger 6 $\frac{3}{4}$ Inches long, the length of his Span 14 Inches, of his Cubit 2 Foot 2 Inches, of his Arm 3 Foot 2 $\frac{1}{2}$ Inches, from the Shoulder to the Crown of his Head 11 $\frac{3}{4}$ Inches.

An Iriſhman *of an extraordinary Size; by Dr.* Plot. n.240. p.184. 1698.

2. In the Year 1682, I ſaw and meaſured *Edmund Mallone* at *Dublin*; his Father, though a proper Man, no way remarkable for his Height, but his

By Dr. Molyneux. n. 261. p. 502.

Mother was of a more than ordinary low Stature: When he ſtood on the bare Ground with his Shoes off, he meaſured full 7 Foot 7 Inches in Height; that is, about 2 Foot taller than a Man of a common Size.

A prodigious Os Frontis; *by Dr.* Tho. Molyneux. n. 168. p. 880. 1685.

II. 1. I have meaſured a prodigious large *Os Frontis*, which is reſerved in the *Medicine School* at *Leyden*. It is entire, and differs in no Reſpects from that of a Man, but in its Largeneſs; and ſince there's no Creature, eſpecially of the larger ſort, that has this Bone at all reſembling ours, there's not the leaſt Queſtion to be made, but this formerly belonged to a Man, and that of a moſt extravagant Size. From its Juncture with the Naſal Bones, to the Place where the *Sutura Sagittalis* terminated, the Convex way, it was 9 Inches $\frac{1}{10}$; tranſverſly from Side to Side, ſtill meaſuring the Convex way, it was 12 Inches $\frac{2}{10}$; in Thickneſs about $\frac{1}{2}$ Inch. I find ordinary Skulls ſcarce anſwer it in half Proportion; being one with another about 4 $\frac{1}{2}$ Inches long, 6 broad, and $\frac{1}{4}$ thick. So that ſuppoſing this Bone bore the ſame Proportion to his Stature, which the ſame in other Men does to theirs, the Man to whom this Bone belonged muſt have been 11 or 12 Foot high. Dr. *Drelincourt*, the preſent Profeſſor of *Anatomy*, told me, That he found it there when he firſt came into that Place, but never could learn who gave it, where it was found, or whence it came.

That there are ſome whoſe Heads are very large in proportion to their Bodies cannot be denied; yet generally ſuch Skulls want in Thickneſs (as this does not) are ill ſhaped, and not proportionable; and moreover, I am perſwaded, there never yet was an Inſtance of any Head, which by a præternatural Growth, came the leaſt nigh this for Bulk.

Giants; by Dr. Tho. Molyneux. n. 261. p. 487. 1700.

2. I am not ignorant, that ſeveral Authors (as *Tho. Fazellus*, *Athan. Kircher*, *Gaſpar Shottus*, and others) both antient and modern, have taken Pains to regiſter Accounts, not of Gigantick Bones only, but of entire Bodies of vaſtly Gigantick Men, found buried under Ground, or in the hollow Caverns of Mountains: But theſe Relations are commonly taken up by Hear-ſay only, and ſo ill atteſted, that they deſerve but very little Credit. And though there is hardly any conſiderable Collection of Natural Curioſities, or a printed Deſcription of a *Muſæum*, extant, where ſome Part or other of a Giant is not to be met with, yet I am much of the ſame Opinion, as to moſt of theſe Gigantick Remains, with the Hiſtorian *Suetonius Tranquillus*, who ſays of *Auguſtus Cæſar*, that *Ædes ſuas non tam Statuarum Tabularumque pictarum Ornatu, quam Rebus Vetuſtate ac Raritate notabilibus, excoluit; qualia ſunt Capreis immanium Belluarum Ferarumque Membra prægrandia, quæ dicuntur* Gigantum *Oſſa*. And certainly, moſt of pretended Giants Remains in our Days, ſuch I mean as are truly Bone (for ſome are only natural Petrifications, and *Lapides ſui Generis*, accidentally ſo figured as to reſemble this or that Part of a Man) were Bones belonging to ſome of the biggeſt Quadrupeds, as Elephants, or ſome of the largeſt ſort of Fiſhes of the Whale Kind, called by *Pliny*, as well as *Suetonius*, *Belluæ* and *Belluæ Marinæ*. And I am perſwaded, that the large Tooth, mentioned by *Ol. Wormius*, and figured by *Tho.*

Muſæum.

Bartholine, was nothing elſe than a Tooth of the *Cetus Dentatus*, or *Sperma-Ceti-Whale.* Nor is it long ſince, that the Bones of the Fore-fin of a Porpeſs or a ſmall Whale, artificially joined together, were expoſed in *London*, by way of publick Shew, as the Skeleton of a Giant's Hand: For all Fiſh of the *Cetaceus* or Whale-kind, have this Fin made up of juſt ſo many Ranges of Joints, as naturally anſwer our 5 Fingers, and all together does not a little reſemble a Man's Hand. Cent. I. *Hiſt Anatom. Hiſt.* 98.

But the prodigious large *Os Frontis* reſerved in the *Medicine School* at *Leyden*, cannot be ſuſpected to appertain to any other Creature than a Man: For this Bone in a Man, is of ſo peculiar a Make from the Globoſe Shape of the Head, that there is not to be found a Bone among all the Animals of the Creation, that bears any Reſemblance to its Figure, if we except that of a Monkey; but all this Genus being of a much ſmaller Size than a Man, gives us no Umbrage of Scruple. So that there is no Room to doubt of its being a true and genuine Part of a large human Animal; as will more clearly appear by comparing the neat Sketches drawn from the Bone itſelf by Mr. *Hugh Howard*, with a common *Os Frontis* of the ordinary Size in the following Figures; where

Fig. 1. *Figure* 1, ſhews the common Shape and Size of the Fore-head Bone of a Man of an ordinary Stature, with its Convex or Out-ſide forward. *a b c d e*, The Line the *Coronal Suture* makes with Indentures, elegantly expreſſed, going round the upper Edge of the Bone by which it's joined to both the *Oſſa Bregmatis*, or *Verticis*. *e*, The place where the *Coronal* and *Sagittal* Sutures meet. *f*, The Part to which the Bones of the Noſe are faſtened. *g g*, The upper Part of the Orbits of the Eyes. *h h*, The Holes in the Bone over the Eyes, that give Paſſage to the two large Branches of Nerves that ſupply the Frontal Muſcle, and thoſe of the Eye-brows. *i i*, The two Proceſſes or Protuberances that join with the firſt Bone of the upper Jaw: Theſe by ſome Accident were broken off the large Bone, and therefore are not expreſſed in *Fig*. 2. The Meaſure round the Ambit of the *Coronal* Suture from *a* to *g*, was 10 Inches and $\frac{1}{11}$ of an Inch; in this Bone from *c*, where the *Coronal* and *Sagittal* Sutures meet, to *f*, where the Bones of the Noſe are faſtened, 4 $\frac{1}{2}$ Inches; from *b*, drawing a tranſverſe Line croſs the Fore-head to *d*, 6 Inches; the Thickneſs of the Bone was about $\frac{1}{4}$ of an Inch.

Fig. 2. *Figure* 2, repreſents the Gigantick Fore-head Bone, expreſſed in the ſame Poſture with the former, and drawn exactly to the ſame Proportion. *a b c d e*, The *Coronal* Suture, in ſome Places a little worn and defaced. *c*, The Place where the *Coronal* and *Sagittal* Sutures meet. *f*, The Part where the Bones of the Noſe were faſtened. *g g*, The upper Part of the Orbits of the Eyes. *h h*, The two Holes for the Nerves that paſs into the Muſcles of the Eye-brows and the Frontal Muſcle. The Meaſure round the Ambit of the *Coronal* Suture in this Bone from *a* to *e*, was about 21 Inches; from *c*, where the *Sagittal* and *Coronal* Sutures meet, to *f*, where the Bones of the Noſe are faſtened, 9 Inches and one 10th of an Inch; *b*, from drawing a tranſverſe Line acroſs the Fore-head to *d*, 12 $\frac{2}{10}$ Inches; the Thickneſs of the Bone, from one Table to the other, about $\frac{1}{2}$ an Inch.

Fig. 3. *Figure* 3, ſhews the Inſide of the ſame Gigantick Bone, drawn likewiſe in the ſame Proportion. *k k*, The thickneſs of the Bone. *l*, The ſharp and high Proceſs of the *Os cribroſum*, called by Anatomiſts *Criſta Galli.*

By comparing theſe Figures, 'tis evident, what an exact Conformity there is in all Particulars between this large Bone and the like Bone in a Man of a juſt Height; and that they no ways differ but in Magnitude. 'Tis alſo evident, that all the next immediately adjoining Bones, which near make up the entire Head, muſt neceſſarily have been as well ſhaped, and of the ſame Proportion with this Bone; otherwiſe they could not poſſibly cohere, ſo as to adapt themſelves cloſely to one another, and make an entire Globoſe Skull. Whence it muſt follow, that the Man, to whom it belonged, was more than twice the Height that Men uſually are, according to the common Courſe of Nature; that is, more than 11 or 12 Foot high.

It cannot reaſonably be ſuppoſed, that a Man of an ordinary Size could have had ſuch an exceeding large Head; for I conceive, he could not poſſibly ſubſiſt, whilſt ſo ponderous and exceſſive a Maſs of Bone as this Skull, with all that ſuper-abundant Quantity of Brain requiſite to fill its ſpacious Cavity, was growning: Much leſs continue ſo long alive, as to come to Maturity of Years, or Adult and full Manhood; to which, we are ſure, this Perſon muſt have attained, by the great Thickneſs and Solidity of this Bone, as well as its large Size. And though ſometimes from Obſtructions, or other Morbifick Cauſes, our Glands and ſofter *Viſcera* are ſo unequally nouriſhed, as to grow to an immenſe Size, yet ſuch a præternatural Exceſs of Growth in a hard and bony Part, I do not think, has ever yet been obſerved.

'Tis true, Infants far gone in the *Rickets* are frequently obſerved to have great Heads in Proportion to their ſmall emaciated Bodies, and that young Children are alſo liable to the *Hydrocephalus* or *Dropſy* in the Head, which ſometimes ſo dilates it, as to ſwell their Skulls to a more immenſe Size. But neither of theſe Diſorders (for I take the Cauſe to be much the ſame in both Caſes, only differing in Degree) otherwiſe affect the Head, than by a præternatural Collection of ſerous Humours incloſed in the Brain, they extend the yielding Sides of the weak and tender Skull, but do not in the leaſt increaſe its bony Subſtance; nay, on the contrary, they rather diminiſh it; for it is always obſerved, that they reduce it to a more than uſual Thinneſs, and ſometimes, as I have ſeen myſelf, to be no thicker than an Egg-ſhell or Parchment. Nor can ſuch Diſtempers poſſibly affect thoſe of adult Ages, ſo as to enlarge their Skulls; becauſe all the Bones by that time are become ſolid, and firmly knit together, ſo as to be no way capable of further Growth or Extenſion: And hence it is, thoſe Maladies are incident to Children, and them only, whilſt their Skulls are ſoft, pliable, and truly Membranous, rather than Bony. And daily Experience aſſures us, that unleſs ſuch Diſeaſes be timely removed, either by the Phyſician's or Chirurgeon's Art, or overcome ſo early by the Strength of Nature, as the Children have Time enough to out-grow this Diſproportion in their Heads, by the Bulk of their Body coming up to it, e'er it ariſe to too exorbitant a Degree of Magnitude; they all die in their Infancy, and their unſhapely Skulls are eaſily diſtinguiſhed from all others, by the large Fontanell, or Open in the Mole of the Head, that remains Membranous, and never becomes, like the reſt of the Skull, a Bony Subſtance. And that they cannot poſſibly arrive at Manhood is plain; for this monſtrous and unequal Growth, or rather Swelling of their Heads, meeting with no Check, but ſtill every Day increaſing upon them, when it arrives to ſuch a certain Degree, that its extravagant Dimenſions become irreconcilable with the natural Functions of the Body, the *Oeconomia Animalis* muſt inevitably ſink under the Preſſure of ſo great a Load, and the whole Machine tend to its Diſſolution, as not being able to bear any longer with ſo highly morbid a Diſpoſition, in ſo principal, and ſo extreamly neceſſary a Part to Life as the Brain, the Fountain of all Spirit, Senſe and Motion.

I ſhall not deny, but by one Accident or other, ſome Diſproportion between the Head and the reſt of the Body, in ſuch as are grown up to the compleat Stature of Man, does ſometimes happen. But a Diſproportion of this Kind, however remarkable to the Eye and unſeemly, is never ſo extraordinary as to be very conſiderable in its ſelf. For I find the Circumference of a Man's Head of a moderate, that is the moſt common ſize, is uſually about 22 Inches, and if we chance to ſee one of 25 or 26 on a Man of ordinary Height, which certainly is very rare, it appears large and remarkable; but ſhould there be found a Head ſtill bigger, ſo as to be 28 or 29 Inches in Ambit (which I am apt to think, for the Reaſons above-mentioned, has ſcarce or ever happened, unleſs where the Proportion of the other Parts of the Body were ſuch as neceſſarily required it) ſuch a one, I ſay, would be really wonderful, and counted monſtrous. Yet the Circumference of the Head, of which this large Fore-head Bone was a Part, ſo far exceeded the largeſt of theſe Meaſures, that, as I computed its Dimenſions, when it was entire and covered with the hairy Scalp, it was about 44 Inches round; and therefore muſt have had a Body belonging to it, that bore a proper Conformity to this its ſpacious Circumference.

Nor do I apprehend ſo great a Stature as this in a human Body, though it be indeed extraordinary, any way abſurd or repugnant to the Courſe of Nature; but rather, if duely weighed, very conformable to a certain anomalous Method, if I may ſo call it, that ſhe apparently affects in the producing moſt of her Works. Thus we cannot but obſerve in the Vegetable Kingdom, that ſome are of the Dwarf-kind, while others ariſe to ſo ſtupendous a Growth, that they more than double the Bulk even of ſuch as are eſteemed large in the ſame Tribe. Several Examples of ſuch like Gigantick Oaks, and other Sorts of exceeding vaſt Trees, may be ſeen regiſtred by Mr. *Evelyn.* Sylva. c. xxx.
And amongſt Animals, if we compare that little low Breed of Race-Horſes from the *Iſle of Man*, uſually called *Mank*'s Horſes, to that large Breed they have in *Northamptonſhire* in *England*, or in the Biſhoprick of *Liege* in *Flanders*, we may properly enough eſteem theſe, in Compariſon with thoſe, a Sort of Gigantick Horſes. Or, if the *Iriſh Wolf Dog*, which is of the Grey-hound kind, and of ſo beautiful and large a Make, that for its curious Form, as well as goodly Size, it far ſurpaſſes all other Dogs of the Creation, be compared to a common Greyhound, it appears truly of a Gigantick Breed; and we may further

further add concerning it, As the Giant's Stock of old is extinct, at leaſt in theſe Countries, ſo this Gigantick Dog is now ſo rare, that in a few Generations more, I doubt not but it will be quite loſt in theſe Parts, and the Species periſh, for ought I know, off the Face of the Earth.

And that Nature takes the ſame uncertain Meaſures in the Generation of Mankind, I think, is not leſs apparent. Thus the *Laplanders* are a Nation remarkable for their low Stature; and 'tis ſure, there are, and have been in all Ages and Countries, thoſe we call *Dwarfs*, and ſome of them of a moſt extraordinary ſmall Size of Body. The Duke of *Crequi*'s famous Dwarf, as deſcribed by *Aldrovandus*, was not in Height above 30 Inches; and the ſame Author ſpeaks of others ſtill ſhorter. Now ſince natural Cauſes operate ſo as to produce human Creatures, partaking of all Properties common to their Kind, of ſo ſmall a Model as to fall ſhort even of half the common Standard of their Species, I cannot think it unreaſonable, ſuppoſing we had no other Authority for it, to imagine that the ſame natural Cauſes may ſometimes act in the other Extream likewiſe.

There is a manifeſt Alliance and Congruity obſervable in Nature, between the Stature of Man's Body, and his Age during the Time of his Growth; whence the *Greeks* thought it not improper to expreſs both theſe by one and the ſame Word ἡλικία, which ſignifies promiſcuouſly Stature as well as Age. And as 5 ½ Feet may well be eſteemed the moſt ſettled and ordinary Degree of Height in a Man; ſo about 70 Years may juſtly be allowed the moſt common Period of his Age: Yet daily Experience and Obſervation acquaint us with thoſe that vaſtly exceed theſe Limits, in both theſe Reſpects: And as we have certain Hiſtory that informs, That the youngeſt of theſe, *Thomas Parr*, and *Henry Jenkins*, both of *England*, and the old Counteſs of *Deſmond*, and Mrs. *Eckleſton*, both of *Ireland*, fully compleated double that uſual Term of Life; ſo we have no Reaſon to queſtion the Accounts given us of others, that have been found in Stature double the common Standard of Man. Nay, both theſe Properties, Longævity and high Stature, do ſo naturally reſult each from their proper Cauſes, that they are often obſerved to become Hereditary, and run in whole Families; whence the *Greeks* had their μακρόβιοι, and the *Romans* their *Celſi*; and in *Paleſtine* of old, they had their *Anakims*, or Sons of the Giants. So that human Gigantick Bodies are no way inconſiſtent with the Courſe of Nature. And indeed, we have ſome clear Teſtimonies given us by Authors of unqueſtionable Credit and Veracity, that there actually have been Men in the World, and likely ſtill are, of ſo large a Bulk, and ſo high a Stature of Body, as properly to deſerve the Name of Giants. *Edmund Mallone*, when he ſtood on the bare Ground with his Shoes off, meaſured full 7 Foot 7 Inches in Height; *Walter Parſons*, Porter to King *James* I. born in *Staffordſhire*, was much of the ſame Stature. In *Flanders* and *Germany*, where Men are uſually of a larger Size, and their Bodies of a groſſer Make than with us, we meet with Examples that have been much taller. *Iſbrand Diemerbroeck* tells us, he ſaw himſelf at *Utrecht*, in the Year 1665, a Man 8 Foot and a half high, all his Limbs well ſhaped, and his Strength proportionable to his Height. He was born at *Schoonhoven* in *Holland*, of Parents of

Vid. Sup. Sect. I.

Anat. c. i. lib I.

an ordinary Stature; and Mr. *Ray* mentions, That he ſaw this very Man at *Bruges* in *Flanders*. *Jo. Goropius Becanus* ſays, he ſaw a Youth almoſt 9 Foot high, a Man near 10 Foot, and a Woman that was quite 10 Foot in Height. *Pliny* the Naturaliſt ſpeaks of ſeveral Men in his Age, much of the ſame Height, or ſomething taller, than thoſe mentioned by *Becanus*. And it is not improbable, that where both the Soil and Climate concur, and are naturally diſpoſed to produce Plants, Fruits, and ſeveral Kind of Animals, of a much larger Bulk than any our Countries afford, ſuch as the Oſtridges and Cunters among Birds; the largeſt Crocodiles, the Mooſe Deer, the Elephant, the Rhinoceros, the Hippopotamus, &c. among Quadrupeds: In thoſe Parts of the World, I ſay, where ſuch like vaſt Creatures are met with, it is not unlikely that human Animals may alſo be ſometimes found of a much greater Size than any here among us. Thus *Andreas Thevet*, the famous Voyager, tells us, That being himſelf on the Coaſt of *Africk*, in the Territory of *Arguin*, for three Weeks together, he chanced to meet with a rich *Spaniſh* Merchant, who had ſome while before ſuffered Shipwreck there by a Storm, yet had luckily ſaved a Coffer, wherein he had carefully preſerved the Skull and Bones of an *American* Giant, he had brought along with him from that Country; who was 11 Foot and 5 Inches in Height, and died in the Year 1559. Theſe Bones he ſhewed to Mr. *Thevet*, who was ſo curious, that he took the Meaſures of the moſt principal of them, as follows: The Bones of the Legs meaſured full 3 Foot 4 Inches in Length, and the Skull was 3 Foot 1 Inch about. Which Circumference, I obſerve, is exactly proportionable to the Length of the Legs, and if we make an Allowance for the Hair and Skin that covered the Skull when he was alive, it falls very little ſhort of the Dimenſions we have before ſet down in computing the Size of our Giant's Head when it was entire.

Travels.

Origen Antwerp, p. 207, 212.

Nat. Hiſt. l. VII. c. xvi.

Deſcript. of *America*, l. XXVII. c. i.

And this brings into my Thoughts, as if it were not unlikely, that this large *Os Frontis* we have deſcribed, might about 70 or 80 Years ago (for it ſeems freſh, and is ſtill ſolid and ponderous, ſo that it cannot be very old) have been brought into *Europe* by ſome of the Trading *Hollanders*, as a proper Sample of ſome huge Gigantick Man, met with in ſome of their Voyages into *America*. But this is only Conjecture; and indeed, it does not import much whether he diſcover the true Original of it or no.

From theſe warrantable Hiſtories, and this particular Bone before us as a fair Specimen, we may clearly deduce, that there have been in Nature human Bodies 11 and 12 Foot high; which equals, if not ſurpaſſes the Stature of the talleſt Giant mentioned in *Holy Writ*. For the Height of *Goliah* of *Gath* is ſaid expreſly to be but *6 Cubits and a Span*; and taking a *Cubit*, in the moſt vulgar and uſual Acceptation, for a Foot and a half, his Stature will not amount to above 9 Foot 9 Inches. Indeed we may reaſonably conclude, that *Og* the the King of *Baſan* muſt have conſiderably exceeded *Goliah* in Height, if we make an Eſtimate of his Stature by the Dimenſions which are given of his Bed-ſtead, which is ſaid to have been kept as a Memorial of him at *Rabbath of the Children of Ammon*, and to have been *9 Cubits in Length*; but then we cannot imagine, but that his Bed muſt of Neceſſity have been

1 Sam. xvii. 4.

Deut. iii. 11.

much longer than his Body; and the leaſt Allowance we can make for the Overplus, is the Space of 9 Inches above his Head, and as much below his Feet; and if we make this Diſtinction, it will follow he was not above 12 Foot high; much of the ſame Standard with this our Giant, whoſe Forehead Bone is ſtill kept in the *Medicine-School* at *Leyden*.

A Man of a ſtrange imitating Nature; by Dr. Geo. Garden. n. 134. p. 842. 1677.

III. At *Strathbogie*, not far from *Aberdeen*, there is a Man who hath ſomething peculiar in his Temper, that inclines him to imitate unawares, all the Geſtures and Motions of thoſe with whom he converſeth. His Name is *Donald Monro*; he is a little, old, and very plain Man, of a thin ſlender Body; he hath been ſubject to this Infirmity, as he told us, from his very Infancy. He is very loath to have it obſerved, and therefore caſts down his Eyes when he walks in the Streets, and turns them aſide when he is in Company. We had made ſeveral Trials before he perceived our Deſign; and afterward had much ado to make him ſtay. We careſſed him as much as we could, and had then the Opportunity to obſerve, that he imitated not only the ſcratching of the Head, but alſo the wringing of the Hands, wiping of the Noſe, ſtretching forth of the Arms, *&c.* And we needed not ſtrain Compliment to perſwade him to be covered; for he ſtill put off and on as he ſaw us do; and all this with ſo much Exactneſs, and yet with ſuch a natural and unaffected Air, that we could not ſo much as ſuſpect he did it on Deſign. When we held both his Hands, and cauſed another to make ſuch Motions, he preſſed to get free; but when we would have known more particularly, how he found himſelf affected, he could only give us this ſimple Anſwer, That it vexed his Heart and his Brain.

A Negro-Boy dappled with white Spots; by Mr. Will. Byrd. n. 235. p. 781. 1697.

IV. Capt. *Cha. Wager* has a *Negro-Boy*, about 11 Years old, who was born in the upper Parts of *Rappahanock* River in *Virginia*: His Father and Mother were both perfect Negroes. This Boy, till he came to be three Years old, was in all Reſpects like other Black Children, and then, without having any Diſtemper, began to have ſeveral little white Specks in his Neck and upon his Breaſt, which with his Age, have ſince been obſerved to increaſe continually very much, both in Number and Bigneſs; ſo that now, from the upper Part of his Neck (where ſome of his Wool is already turned White) down to his Knees, he is every where dappled with white Spots, ſome of which are broader than the Palm of a Man's Hand, and others of a ſmaller Proportion. The Spots are wonderfully White, at leaſt equal to the Skin of the faireſt Lady, and are not liable to be tan'd: But they are, I think, of a paler White, and do not ſhew Fleſh and Blood ſo lively through them as the Skin of white People; but poſſibly the Reaſon of that may be, becauſe the Skin of a Negro is much thicker. His Face, Arms and Legs, are perfectly Black: He has all along been very ſprightly and active, and has more Ingenuity too, than is common to that Generation.

Phyſiognomy; by Dr. Gwither. n. 210. p. 118. 1694.

V. Soft Wax cannot receive more numerous and various Impreſſions, than are imprinted on Man's Face by Objects moving his Affections: And not only the Objects themſelves have this Power, but alſo the very Images or Ideas; that is to ſay, any thing that puts the Animal Spirits into the ſame Motion that the Object preſent did, will have the ſame Effect with the Object. To prove the firſt, let one obſerve a Man's Face looking on a pitiful Object, then a ridiculous, then a ſtrange, then on a terrible or dangerous Object, and ſo forth: For the ſecond, that Ideas have the ſame Effect with the Object, Dreams confirm too often.

The Manner I conceive to be thus; the Animal Spirits moved in the Senſory by an Object, continue their Motion to the Brain, whence the Motion is propagated to this or that particular Part of the Body, as is moſt ſuitable to the Deſign of its Creation, having firſt made an Alteration in the Face by its Nerves, eſpecially the *Pathetick* and *Oculorum Motorii*, actuating its many Muſcles, as the Dial-plate to that ſtupendious Piece of Clock-work, which ſhews what is to be expected next from the ſtriking Part: Not that I think the Motion of the Spirits in the Senſory continued by the Impreſſion of the Object all the way, as from a Finger to the Foot; I know it too weak, though the Tenſeneſs of the Nerves favours it: But I conceive it done in the Medulla of the Brain, where is the common Stock of Spirits; as in an Organ, whoſe Pipes being uncovered, the Air ruſhes into them, but the Keys let go, are ſtopped again: Now if by repeated Acts or frequent entertaining of the Ideas of a favourite Paſſion or Vice, which natural Temperament has hurried one to, or Cuſtom dragged, the Face is ſo often put into that Poſture which attends ſuch Acts, that the Animal Spirits find ſuch latent Paſſages into its Nerves, that it is ſometimes unalterably ſet (as the *Indian Religious* are, by long continuing in ſtrange Poſtures in their *Pagods)* but moſt commonly ſuch a Habit is contracted, that it falls inſenſibly into that Poſture, when ſome preſent Object does not obliterate that more natural Impreſſion by a new, or Diſſimulation hide it. Hence it is, that we ſee great Drinkers with Eyes generally ſet towards the Noſe, the adducent Muſcles being often employed to let them ſee their loved Liquor in the Glaſs in the Time of drinking, which were therefore called Bibitory; laſcivious Perſons are remarkable for the *Oculorum Mobilis petulantia*, as *Petronius* calls it. From this alſo we may ſolve the *Quaker*'s expecting Face, waiting the pretended Spirit, and the melancholy Face of the Sectaries; the ſtudious Face of Men of great Application of Mind; revengeful and bloody Men, like Executioners in the Act; and though Silence in a Sort may a while paſs for Wiſdom, yet ſooner or later *Sir Martin* peeps through the Diſguiſe to undo all; a changeable Face I have obſerved to ſhew a changeable Mind. But I would by no means have what has been ſaid underſtood as without Exception; for I doubt not, but ſometimes there are found Men with great and vertuous Souls under very unpromiſing Outſides.

The Pores in the Skin; by Dr. Neh. Grew. n. 159. p. 566. 1677.

VI. By *Pores*, Phyſicians mean no more, than certain permeable Spaces between the Parts of a Body. Wherefore that there are Pores in the Skin of every Man's Body, is no more to be queſtioned, than whether Men do ever ſweat or perſpire. But in the Hands and Feet, theſe Pores are very remarkable. For if one will with an indifferent Glaſs, ſurvey the Palm of his Hand very well waſhed with a Ball, he may perceive innumerable little Ridges, of equal Bigneſs and Diſtance, and every where running parallel one with another; and eſpecially upon the Ends and firſt Joints of the Fingers and Thumb, upon the Top of the Ball, and near the Root of the Thumb a little above the Wriſt. In all which Places they are very regularly diſpoſed into Spherical Triangles, and Ellipticks. Upon theſe Ridges ſtand the Pores, all in even Rows, and of that Magnitude, as to be viſible to a very good Eye without a Glaſs. But being viewed with one, every Pore looks like a little Fountain, and the Sweat may be ſeen to ſtand therein, as clear as Rock-water, and as often as it is wiped off, to ſpring up within them again. That which Nature intends in the Poſition of theſe Ridges is, that they may the better ſuit with the Uſe and Motion of the Hand: Thoſe of the lower Side of every Triangle, to the Bending in or Clutching of the Fingers; and thoſe of the other two Sides, and of the Ellipticks, to the Preſſure of the Hand or Fingers Ends againſt any body, requiring them to yield to the Right and Left. And the Pores are placed upon theſe Ridges, and not in the Furrows which lie between them, that ſo their Structure might be the more ſturdy, and leſs liable to be depraved by Compreſſion; whereby only the Furrows are dilated or contracted, the Ridges conſtantly maintaining themſelves, and ſo the Pores unaltered. And for the ſame Reaſon, the Pores are alſo very large, that they may ſtill be the better preſerved, though the Skin be never ſo much compreſſed and condenſed, by the conſtant Uſe and Labour of the Hand; and ſo thoſe of the Feet, notwithſtanding the Compreſſion of the Skin by the Weight of the whole Body.

Fig. 4.

Fig. 5.

Theſe Pores are a very convenient and open Paſſage for the Diſcharge of the more noxious and perſpirable Parts of the Blood; which, by the continual uſe of the Hands and Feet, are plentifully brought into them. Whence it is, that many hypochondriacal Men, and hyſterical Women, have almoſt a continual Burning in the Soles of their Feet, and the Palms of their Hands; yet not on the Top of their Feet, or Back of their Hands; which being leſs diſpoſed to receive the noxious Parts, are therefore unfurniſhed with this Kind of Pores.

The Pores of the Skin wholly obſtructed by nocturnal Air; by — n. 8. p. 138. 1665.

VII. Not many Years ſince, there was in this Country (near *Leyden*) a Student, who being much addicted to the Study of Aſtronomy, and ſpending very many Nights in Star-gazing, had, by the nocturnal wet and cold Temper of the Air, in ſuch a Manner obſtructed the Pores of his Skin, that little or nothing exhaled from his Body; which appeared hence, becauſe that the Shirt he had worn 5 or 6 Weeks, was then as white as if he had worn it but one Day. In the mean while, he gathered a ſubcutaneous Water, of which he was afterwards well cured.

The great Effects of Touch, and Friction; by——— n. 12. p. 206. *Hiſt. of Life and Death.* 6. *Sect.* 3. 1666.

VIII. 1. My Lord *Verulam* obſerves, that Motion and Warmth (of which two Friction conſiſts) draw forth into the Parts new Juice and Vigour, and conduce much to Longevity. And Mr. *Boyle* obſerves, how in our Stables a Horſe well curried is half fed; and how ſome can tell by the Milk of their Aſſes, whether that Day they have been well curried or not; arguing hence, That if in Milk the Alteration is ſo conſiderable, it ſhould be ſo likewiſe in the Blood, or other Juices, of which the Blood is elaborated, and conſequently in divers of the principal Parts of the Body. To theſe Obſervations may be added what Dr. *Beal* not long ſince communicated. 1. That he could make good Proof of the Curing or Killing a very great and dangerous Wen (that had been very troubleſome for 2 or 3 Years) by the Application of a Dead Man's Hand; whence the Patient felt ſuch a cold Stream paſs to the Heart, that it did almoſt cauſe in him a Fit of Swooning. 2. That upon his Brother's Knowledge, a certain Cook in a Noble Family, being reproached for the Uglineſs of his Warty Hands, was bid by his Lord to rub his Hand with that of a Dead Man; and that his Lord dying ſoon after, the Cook made uſe both of his Lord's Advice and Hand, and ſpeedily found good Effect. 3. That a Gentleman, who came lately out of *Ireland*, informed him of an aged Knight there, who having great Pain in his Feet, inſomuch that he was unable to uſe them, ſuffered a loving Spaniel to lick his Feet, Mornings and Evenings, till he found the Pain appeaſed, and the Uſe of his Feet reſtored. This, ſaith the Relator, was a gentle Touch, and Tranſpiration; for he found the Spirits tranſpire with a pleaſing Kind of Titillation. 4. That he can aſſure of an honeſt Blackſmith, who cauſed Vomitings by ſtroaking the Stomach; gave the Stool by ſtroaking the Belly; appeaſed the Gout and other Pains, by ſtroaking the Parts affected.

Uſefulneſs of Exper. Phil. c. xv. Sect. 2.

Cures done by Mr. Greatrix *the Stroaker, by* M. M; *Communicated by Mr.* Thoreſby. n. 256. p. 332. 1699.

2. 'Tis near 20 Years ſince I ſaw Mr. *Greatrix* ſtroak any: But I give you nothing here, which ſeveral Friends, who were Eye-witneſſes, as well às myſelf, do not remember, and think exactly true.

My own Brother, *John D——n* was ſeized with a violent Pain in his Head and Back; Mr. *Greatrix* (coming by Accident to our Houſe) gave preſent Eaſe to his Head, by only ſtroaking it with his Hands. He then fell to rub his Back, which he moſt complained of; but the Pain immediately fled from his Hand to his right Thigh; then he purſued it with his Hand to his Knee, from thence to his Leg and Ancle and Foot, and at laſt to his great Toe. As it fell lower, it grew more violent, and when in his Toe it made him roar out; but upon rubbing it there it vaniſhed.

My Uncle's Daughter was ſeized, when a Girl, with a great Pain and Weakneſs in her Knees, which occaſioned a white Swelling; this followed her for ſeveral Years, and having uſed divers Means to no Effect, after 6 or 7 Years time, Mr. *Greatrix* coming to *Dublin*, and lodging at my Father's, my Aunt brought her to him. He ſtroaked both her Knees, and gave her preſent Eaſe, the Pain flying downwards from his Hand, till he drove it out of her Toes, and the Swelling, in a ſhort Time, wore away, and never troubled her after.

I had alſo a Comrade, who, after a Fever, was much troubled with a Pain in her Ears, and very deaf; Mr. *Greatrix* put ſome of his Spittle into her Ears, and turning his Finger in her Ears, rubbed and chafed them well, which cured her both of the Pain and Deafneſs: And an oppoſite Neighbour tells me, That her Uncle was cured by him of the ſame Malady. Another told me, That when a Child, being extreamly troubled with the King's Evil, ſhe was touched by King *Charles* II. but ſhe was nothing the better; but Mr. *Greatrix* perfectly cured her. A Smith near us had two Daughters extreamly troubled with the Evil, the one in the Thigh, and the other in the Arm; he cured them both: One of them lives ſtill there; ſhe is a healthy Woman, and the Mother of ſeveral Children. The Scars of the Evil Sores ſtill remain on her Arms, though it is 20 Years ſince it was cured; ſince when ſhe never had any Symptoms of it.

Where Mr. *Greatrix* ſtroaked for Pains, he uſed nothing but his dry Hand; if Ulcers or running Sores, he would uſe Spittle on his Hand or Finger; and for the Evil, if they came to him before it was broke, he ſtroaked it, and ordered them to poulteſs it with boiled Turneps, and did ſo every Day till it grew fit for Lancing: He then Lanced it, and with his Fingers would ſqueeze out the Cores and Corruption, and then in a few Days it would be well with only his Stroaking of it every Morning; but if it were broke before he ſaw them, he only ſqueezed out the Core, and healed it by Stroaking. Such as were troubled with Fits of the Mother, he would preſently take off the Fit, by only laying his Glove on their Head; but I never knew any that he cured of that Diſtemper, for their Fits would return; but I have heard he cured many of the Falling Sickneſs, if they ſtayed with him, ſo that he might ſee them in 3 or 4 Fits, elſe he could not cure them.

A Girl in Ireland *with Horny Excreſcencies: by Mr.* St. Geo. Aſh. n. 176. p. 1202. 1685.

IX. 1. This Horny Girl is called *Anne Jackſon*, born in *Waterford* of *Engliſh* Parents, who are both ſaid to have been ſound and healthy: This Infirmity did not ſhew itſelf, till ſhe was about 3 Years old. She is now about 13 or 14 Years of Age, yet can ſcarce go, and is ſo little in Stature, that I have ſeen Children of 5 Years old taller. She is very ſilly, ſpeaks but little, and that not plainly, haſtily and with Difficulty: Her Voice is low and rough; her Complexion and Face well enough, except her Eyes, which look very dead, and ſeem to have a Film or Horn growing over them, ſo that ſhe can hardly now perceive the Difference of Colours. The Horns abound chiefly about the Joints and Flexures, and not on the brawny fleſhy Parts of her Body; they are faſtened to the Skin like Warts, and about the Roots reſemble them much in Subſtance, though toward the Extremities they grow much harder and more horny: At the End of each Finger and Toe, grows one as long as the Finger or Toe; not ſtraight forwards, but riſing a little between the Nail and the Fleſh (for near the Roots of theſe Excreſcencies is ſomething like a Nail) and bending again like a Turkey's Claw, which too it much reſembles in Colour: On the other Joints of her Fingers and Toes are ſmaller ones, which ſometimes fall off, others growing in their Places. The whole Skin of her Feet, Legs and Arms, is very hard and callous, and does daily grow more and more ſo: On her Knees and Elbows, and round about the Joints, are many Horns; two more remarkable at the Point of each Elbow, which twiſt like Rams Horns: That on the left

Arm is above ½ Inch broad, and 4 Inches long: On her Buttocks grow a great Number, which are flat by frequent ſitting: At her Arm-pits and the Nipples of her Breaſts, ſmall hard Subſtances ſhoot out, much ſlenderer and whiter than the reſt: At each Ear alſo grows a Horn; the Skin of her Neck does of late begin to turn callous and horny, like that of her Hands and Feet. She eats and drinks heartily, ſleeps ſoundly, and performs all the Offices of Nature, like other healthy People, except that ſhe never had the Evacuation proper to her Sex.

A Boy in France *with Horny Excreſcencies; by Mr.* Locke. n. 230. p. 594. 1687.

2. In *May*, 1678, at the Hoſpital at *Paris*, called *La Charité*, I ſaw a young Lad of *Brie*, between 19 and 20 Years old, who had, upon the Ends of all his Fingers, as it were, Horns grew out; one whereof, upon the middle Finger of his Right-hand, was 310 *Grys* long, and 130 *Grys* in Circumference. He told me, he had one formerly on his Thumb, much bigger and longer than this, but it was now very ſhort. The like grew alſo upon the Toes of his Feet, only excepting the two ſmall Toes of each Foot, where there are now none, and upon three of them there never had been: Upon the fourth there had been one, but it having fallen off about 6 Months ſince, came no more, but left the Nail very little different from Natural. This Horny Subſtance grew not out of the End of the Fingers, but was, as it were, a Thickning of the Nail, which, inſtead of growing out in Length, increaſed in Thickneſs; but roſe not up ſtraight in a perpendicular Line to the Finger, but as it augmented bended forwards, and ſo grew ſomewhat into the Shape of a Bird's Claw, but that it was not taper and ſharp like that, but blunt at the End, and almoſt of the ſame Bigneſs all along, and full of pretty deep Chaps in the Convex Part, but the Concave was without any. He had no Senſe in the Horny Part itſelf, but that Part where it joins to the Fleſh is very ſenſible and tender. There are alſo, in ſeveral Parts of the Back of his Hands, Horny Excreſcencies, ſome pretty broad, and others leſs, but none riſing much above the Skin; but they look there, thoſe that are broad, like flat, but very broad Warts; but to the Touch they feel much harder.

This Diſeaſe began about 3 Years before, after having had the Small-pox. His Food was the uſual Food of the Country. He has been purged twice ſince he came into the *Charité*; and ſome of the Horns of his Fingers begin to looſen at the Roots.

N. B. A *Gry* is the one thouſandth Part of a *Philoſophical Foot*, which is the third Part of a Pendulum of Seconds; ſo that 310 *Grys* is a little more than 4 *Engliſh* Inches.

A Body, after being long buried, almoſt wholly converted into Hair; by —Ph. Col. n. 2. p. 10.

X. 1. About 43 Years ſince, the Body of a Woman was buried here (at *Norimberg*) in a Coffin of Wood, painted (according to the Cuſtom here uſed) with Black. The Earth in which it was buried was dry and yellow, as the Earth, for the moſt Part, is near this City round about. The Corps lay the loweſt of three in the ſame Grave, there being two other Corps over it. Through the Clefts of the Coffin, much Hair was thruſt out, and had grown very plentifully, inſomuch, that it is believed that the whole Coffin may, for ſome time, have been all covered with *Hair*. The Cover of this

Coffin being removed, the whole Corps appeared perfectly reſembling an human Shape, exhibiting the Eyes, Noſe, Mouth, Ears, and all the other Parts; but from the very Crown of the Head to the Sole of the Foot, covered over with a very thick ſet *Hair*, long and much curled. The Sexton, after a little viewing of it, going to handle the upper Part of the Head with his Fingers, found immediately all the Shape of the Body to fall, and left nothing in his Hand but a Handful of *Hair*; there being neither Skull, nor any other Bone left, unleſs it were a very ſmall Part of that which he ſuſpected to be the great Toe of the Right Foot. This *Hair* was ſomewhat rough at firſt, but afterwards it grew very much harder, and of a Brown Red Colour.

By Mr. Chr. Arnold. *ibid.* p. 50.

2. Beſides the Relation of M. *Wulferus*, concerning the *Hairy Corps* here lately diſcovered, it hath likewiſe been obſerved, that one executed and hanged at this Town for Theft, within ſome Space of Time, was ſtrangely over-grown with *Hair* all his Body over upon the Gallows.

Obſervations of Hair found in ſeveral Parts of the Body; by Dr. Ed. Tyſon. Ph. Col. n. 2. p. 11.

3. It is the Opinion of the Learned *Honoratus Fabri*, * and others, that Hair, Wool, Feathers, Nails, Horns, Teeth, *&c.* are but Animal Vegetables or Plants; if ſo, we may be the leſs ſurpriſed at their Growth on the Body, even after the Deceaſe of the Animal: And as there have been other Examples, ſo the foregoing Obſervation is a remarkable Inſtance thereof. *Petrus Borellus* † thinks, that as Plants, they may be tranſplanted, and made to grow in a Soil they did not at firſt; and ſome Remarks he gives thereon. What he relates concerning Teeth being drawn and ſet again, I know to be true, having tried it formerly in myſelf, and have heard of the like done by others.

As for *Hair*, though the outward Surface of the Body be the uſual Place where it grows, yet hath it been ſometimes found on the Tongue, upon, and in the Heart, in the Breaſts and Kidneys, and other Glandulous and Muſcular Parts of the Body: But there is ſcarce any inward Part more ſubject to it than the *Ovarium*, or Teſticles of Females. I have lately met with three Inſtances of it; an Account of which may poſſibly gratify the Curious.

The firſt was in a Bitch I diſſected in my Chamber at *Oxford*, *An.* 1674; where I obſerved the *Omentum* larger than uſual, but ſo faſtened to the *Inteſtines*, the Extremes of the *Cornua Uteri*, and to the Right-ſide, that I could not readily ſeparate it. Where the Adheſion was, it was ſomewhat inflamed, and had there ſeveral ſmall Glands. But I very much wondered to find here *Hair* growing, ſome on the *Omentum*, others on the *Cornua Uteri*, others in the *Ovarium:* Several of them did lie looſe in the Veins, and two or three I found in the right *Ventricle* of the *Heart*; others were rooted in ſmall Glands. The *Cornua Uteri*, at their Extreams, were joined together; and both *Teſticles* made but one large rude *Glandule*. It had ſeveral Sinous Cavities within, filled with purulent Matter and *Hair*. In the *Cornua Uteri* were the *Veſtigia*, or Tracts of former *Fœtus's*. Before Diſſection, I obſerved the Fore-parts of the Bitch to be well, but the Hinder were very much emaciated. This *Hair* was about an Inch, or an Inch and an half long; and although found in ſo many Places, yet not much in all. It ſomewhat reſembled ſome of the *Hair* of the Skin.

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* *Lib.* III. *de Plantis.*

† *Hiſt.&* *Obſ. med. Cent.* 1. *Obſ.* 10.

My next Obſervation, was in a young Gentlewoman I was at the Diſſecting of, together with Dr. *Morton*, Dr. *Dan. Cox*, &c. in *Nov.* 1679. Where, beſides ſeveral other Particulars we did obſerve that may more nearly relate to the Cauſe of her Death, and lingring Illneſs, we obſerved an unuſual Tumour of the right *Teſticle* or *Ovarium*, which was ſwelled into two Veſicles or Bags, almoſt as big as a Man's Head: One of theſe was much leſs than the other; both conſiſted of a thin Membrane, and had a free Communication on the Inſide one with another; they were filled with a Liquor and Subſtance much reſembling Curds and Whey; for in a thin pale *Lympha* or *Serum*, there did ſwim in ſeveral Lumps and Pieces a *ſteatomatous* or cruddy Matter, which to the Touch was ſoft and fatty, of a dilute yellowiſh Colour, and of no ill or remarkable Smell. Some of it being put into warm Water did, in part, diſſolve. The Inſide of theſe Bags was ſmooth, and without the Adheſion of this Matter, and in no Place, as we obſerved, diſcoloured. One of theſe Lumps or Pieces was half as big as a Man's Fiſt, and in it we found a great deal of *Hair*, as likewiſe in the other Pieces, but not in ſo great Plenty. This *Hair* was of a Silver Colour, very ſoft and fine, but ſtrong; and ſome of it 2 Foot and 3 Inches long. It did not ſeem to grow, or to be faſtened to any Part, but to lie entangled in this cruddy Matter. By keeping, this *Hair* is grown ſomething browner, and by often handling, and by freeing it from that cruddy or fatty Subſtance, much of it broken ſhorter. But on the Outſide of the larger Bladder or Bag, we met with the remaining Part of the *Ovarium* or *Teſticle*, and in it we obſerved ſeveral Eggs, or, at leaſt *Hydatides*, of this [o o] Bigneſs. But we were more ſurpriſed to find there a Bony Subſtance, which ſo exactly repreſented an Eye or Dog-tooth in its Shape, Hardneſs, Colour, and all things, that I cannot better liken it to any thing beſides. It firmly adhered at its Baſis, where it is broadeſt, to the Membranes of the *Ovarium*, and had of each Side of it (at ſmall Diſtances) two other Bones or Teeth, but they were but ſmall, and not of ſo regular a Figure.

This *Tooth* and *Hair* gave a Suſpicion to ſome, that poſſibly they might be the Parts of a corrupted *Embryo*, but I rather think not; for if ſo, we ſhould have met with Bones, or, at leaſt, a purulent Matter: Beſides, the Tooth was without the Cyſtis or Bag, in the *Ovarium*, the *Hair* within. I rather look upon it as a *Luſus Naturæ*, her endeavouring to form ſomething, and being diſappointed of an Animal, produced a Vegetable. Teeth and Bones, at firſt, are ſoft Membranes or Tendons hardening into Cartilages, and Cartilages into Bones. The Tendons of the Legs of Fowl, as of an old *Turkey*, become Bony; ſo have I ſeen the *Arteria Aorta*, Part of the *Emulgent* and *Iliac* Branches of a Woman at *Oxford*, that were *Oſſeous*. Dr. *Willis* mentions the like of the *Carotid Artery*, and I have ſeen it alſo in the great Artery near the Heart in a Horſe, and it is often to be met with in the Hearts of Oxen and Deer. Once I obſerved the outward Membrane of the Liver in a human Body, that was part Schirrous, part Bony: Once I met with the ſame in the *Spleen*, and at another Time (in an antient Gentleman) on the outſide of the *Lungs*. So that even here poſſibly, Part of the *Ovarium* being as it were Callous or Schirrous, it might *Oſſifie*, and ſome unknown Circumſtances might determine and ſhape it into a Tooth.

As for the *Hair* in the Bag or *Cyſtis*, I am apt to think, that that fatty Subſtance, in which it was contained, might contribute much towards it; as the Threads of Silk-worms, the Cobwebs of Spiders, ſo Cotton, the Thrums of the *Gramen Tomentoſum*, *&c.* are from particular Juices. But here they have their Strainers through which they ſhoot, or are as it were wyre-drawn. The *Hair* mentioned in the foregoing Obſervation, was moſt of it radicated in ſmall Glands; but as for that of this, like as ſome Plants that thrive by ſending their Roots into a Fluid Body, the Water, this *ſteatomatous* or fatty Subſtance might prove a ſufficient Soil for propagating and producing them; which I am the more apt to believe, ſince in the following, and ſome other parallel Hiſtories, where ſuch *Hair* hath been found, likewiſe this pinguious or fatty Subſtance hath alſo been obſerved.

Therefore my third Obſervation is of a Gentlewoman, aged about 39 Years, who for a conſiderable Time had been troubled with various Symptoms of the Stone in the *Kidneys*, as bloody Urine, great Pains, Vomitings, *&c.* which in all Probability were the greateſt Cauſe of her Death. Upon opening her Body, there was obſerved near the *Uterus* a Cyſtis or Bag about the Bigneſs of a large Turkey's Egg, and in it a like fatty Subſtance, as before expreſſed; as alſo a great Quantity of light ſoft *Hair*. Faſtened to a fleſhy Subſtance within the Cyſtis was a *Bone*, in ſome ſort reſembling a *Mandible*; for it had ſeveral Sockets, in which were ſeated three large *Dentes Molares*, or Grinders, in a Triangle, and a 4th not yet grown out. In one of the Kidneys was found a large Stone.

How ſubject this Part is to ſuch *Hairy* Tumours, may further appear from the Hiſtories of others; but they make no mention of *Teeth* found there; but I have been acquainted, that the Learned Dr. *Needham*, Diſſecting a Woman here in Town ſome Years ago, in one of the *Ovariums*, which was very much ſwelled, found both a Tooth and Hair there.

An Obſervation conſonant to it, upon the Diſſecting a Morbid Body; *by Dr.* Sampſon. Ph. Col. n. 2. p. 49.

4. In a Woman lately Diſſected, who was the Day before her Death with great Difficulty delivered of a dead Child, there was found two great globoſe Tumours depending upon the Left *Teſticle*, and may rather be called preternaturally grown Eggs, or Parts of the extended *Ovarium*: Both of them lay in the *Pelvis* under the Womb, and ſo hindred the Egreſs of the *Fœtus* which was well grown and big. They were covered with a thick Membrane, which had its Veins and Arteries as conſpicuous as thoſe are in the Urinary Bladder. That neareſt to the *Teſticle* was the leaſt, of the Bigneſs of a Coco-nut, which had in it a fatty Subſtance not fluid, of the Colour of the Yolk of an Egg, and in the midſt of it a Lock of *Hair*, which when it was freed from the Greaſe, appeared of a flaxen Colour: The Fat itſelf crackled in the Fire, melted and took Flame like Lard, and in a Spoon over a Candle would boil and ſmoak, excepting ſome ſmall grumoſe Parts. In the midſt of the Membrane was a hard and knotty Subſtance, in which lay a ſmall Bone of a ſtrange Shape, with a *Perioſtium* upon it, which was

hard to ſeparate from it. The Bone is hard, white, and ſomewhat bigger than the biggeſt of the Bones in the *Meatus Auditorius*.

The other Tumor was thrice as big as the former, and about 2 Inches diſtant from it, yet connected to it by a ſtrong Membrane of the extended *Tunicle*. Opening it, there ſprung out a more white and liquid Sort of Greaſe, but in the Middle was as thick as the former, and of the Colour and Conſtitution of Live-honey; for which Cauſe it may be called a *Meliceris*, though the Imflammability both of this and the other, makes them both *Steatomata*. In the midſt of this lay enveloped, a large Lock or two of *Hair*, variouſly entangled like thoſe the Country-men call *Elfs-locks*, which are a Species of the *Plica Polonica*. The Colour was of a blackiſh Brown, and the Quantity four times as much as the former. Some Part of this *Hair* was long, and evidently grew out of the inward Parts of the Membrane, in which it was radicated, and from whence it was plucked. This Fat was more inflammable than the other, neither did it crackle in burning as the former, and left fewer Spots in the Spoon. In the Duplicatures of this Membrane, alſo was a Lump which contained another miſhapen Bone, very hard and hollow, covered with a Skin like a *Perioſteum* without, and the *Dura Menynx* within: So that it is hard to ſay, whether Nature was forming a Tooth with part of the Jaw, or the whole *Cranium*.

The parenchymous *Parts of the Body; by Sir* Edm. King. *n.* 18. *p.* 316.

XI. The *parenchymous* Parts of the Body are, by Anatomiſts, generally ſuppoſed to be in very many Places wholly void of Veſſels, deſigned chiefly to fill up Cavities and Interſtices between the Veſſels, and to bolſter up the ſame, and to convey them through the Parts.

But having many Years endeavoured to excarnate ſeveral Parts of the Body, *viz.* the *Liver*, *Lungs*, *Spleen*, *Kidneys*, &c. (not to name the *Placenta Uteri*, which ſeems to be *parenchymous* too) and being very deſirous to make a Scheme of the Veſſels of any of theſe, whatever they were, I fixed upon; I found, notwithſtanding all my Care to preſerve the Veſſels, when I was freeing them as heedfully as I could from the ſuppoſed *Parenchyma*, that in every Breach I made either with my Fingers or otherwiſe, all my Endeavours were deſtructive to my Purpoſe: And that upon Examination of thoſe Bits, much of which is called *Parenchyma*, I met in them more Veſſels than I had preſerved in the Parts whence they came: And though the Portion were never ſo ſmall, yet my bare Eye could make this Diſcovery; much more could I, when aſſiſted by a Microſcope, perceive I had deſtroyed more Veſſels than preſerved, in deſpite of the exacteſt Care I was capable to uſe. Then reviewing what Miſchief I had done in every Place, quite through the whole Tract of my Fingers, Knife, *&c.* I began to think with myſelf, That it was not impoſſible for theſe Parts to conſiſt wholly of Veſſels curiouſly wrought and interwoven (probably for more Uſes than is yet known) and the Conſideration, which came into my Mind, of a Piece of fine Cloth (which conſiſts of ſo many ſeveral minute Hairs called Wool) was no Diſcouragement to this Opinion. I then reiterated Experiments over and over; ſome of which proved ſo ſucceſsful, to my Apprehenſion, that I was encouraged in the Year 1663 and 1664, to diſcourſe of it to ſeveral very worthy Perſons; as Mr. *Boyle*, Sir *William Petty*, Dr. *Williams*, Dr. *Lenthal* Dr. *Jaſper Needham*, Dr. *Samſon* (who afterwards ſent me a Letter from *France*, intimating the Acquaintance he had made with the Learned *Steno*, who hath ſince publiſhed ſomething of the ſame Diſcovery) Mr. *Daniel Cox*, and Dr. *Samuel Parker*, &c. who doubtleſs cannot but remember, that then I related to them, I found much Cauſe to believe, that that Subſtance, commonly called *Parenchyma*, was in moſt, if not in all its *parenchymous* Parts, full of Veſſels: However, it had been imagined by all I could ever meet with, to conſiſt in great Part of a Subſtance, in many Places void of Veſſels, deſigned for ſuch Uſes as are above-mentioned. Againſt which I have now further to alledge, 1. That I obſerve in a Piece of Muſculous Fleſh (ſo called) either Raw, Roaſted, or Boiled, *&c.* that if I ſo far extend it, as to make it to be ſeen through, I can (aſſiſting my Eye) perceive it full of Veſſels placed as thick as is poſſible to be imagined (the Fat, if there be any, being firſt removed) there appearing then nothing but Veſſels, yet ſo as with a Microſcope may be ſeen thorough, when they are extended. 2. That if any one, as he is at Dinner, take a Piece of Fleſh, and begin either at the Head or Tail of a *Muſcle*, he may divide it *in infinitum*, all along from Head to Tail, without breaking any thing of that called Fleſh, only theſe tranſverſe Fibres that ſeem to ſtitch them together, and (as I am apt to think) paſs through the very Bodies of the ſmalleſt of them, and quite through the whole Muſcle up to the cutaneous Poroſities: So that there is not one of theſe ſmall *Ducts*, that run *per longitudinem*, but it is furniſhed with a ſufficient Number of Out-lets, when Need requires, though too minute to ſuffer any Alimentary Juice to paſs tranſverſly (in a living Body) or any other Liquor when the Body is dead and cold. But to wave their Uſe at preſent, and to return to what I was ſaying, compreſs between the Fingers this Bit of Fleſh, and you ſhall find the Juice, eſpecially if the Meat be hot, to go before your Fingers toward either End you pleaſe; but if you compreſs both Ends, you ſhall ſee it ſwell into the Middle; and again, if you preſs the Middle, it will run out at both Ends. But further, ſuppoſe a Piece of Fleſh, called *Parenchyma*, as big or as little as you pleaſe, in any Part of the Body, and let me prick it with a Needle, where you ſhall appoint; if you feel it, I preſume you will acknowledge, a Nerve, or a Fribilla related to it, is touched: If you feel it not, I am ſure ſome Liquor, either ſanguineous or other, will follow the Needle: And from whence can that come but out of Veſſels? unleſs accidentally, as by a Contuſion, *&c.* it be extravaſed: In which Caſe my Argument will not be injured, becauſe the Part is depraved, whereas I ſpeak of the Parts as they are in their Natural State.

To confirm and illuſtrate all which, I deſire, that the following familiar Obſervations may be conſidered:

1. If a Horſe, fat and fair to look on, without a Hollow to be ſeen between his Muſcles, be rid extream hard, and into a great Sweat, and then kept one Day without Water or moiſt Meat, you ſhall ſee him look ſo thin in

many Places, as in the Muſculous Parts, that you will hardly believe it to be the ſame Horſe, eſpecially if he be (as the Phraſe is amongſt Horſe-Maſters) a *Naſh* or *Waſh* Horſe: The Cauſe of which Thinneſs will eaſily be granted to be only an Exhauſtion of Juice, expended out of the Blood, which did ſtuff out theſe Veſſels. And whoever, that is uſed to ride hard, ſhall obſerve how thick this foul Horſe breathes, and at what a rate he will Reek and Sweat, will not much wonder at the Alteration. But if the Horſe be a hardy one, and uſe to be hard ridden, then you will ſee that one Day's Reſt, and his Belly full of good Meat and Drink, will in one Day or two reſtore him to his former Plight, the Food being within that ſhort Space of Time ſo diſtributed, that all the Veſſels will be repleniſhed again, as before. And the cleaner the Horſe is, the ſooner recruited, and the leſs ſign of hard Riding will appear. This ſeems to ſhew the Facility with which the Juice, called Blood, paſſeth; which ſurely, if there were ſuch a Thing as a *Parenchyma*, might by ſeveral Accidents (not difficult to mention) be ſo depraved in ſeveral Parts of it, that it might loſe its receptive Faculty; than which it may be thought to have none of greater Uſe, being ſuppoſed to be without Veſſels.

2. Diſcourſing ſometimes with *Graſiers* in the Country, about the Paſture of Cattle, I have been informed by them, That if they buy any old Beaſts, Oxen or Cows to feed, they chooſe rather thoſe that are as poor as can be, ſo they be ſound; becauſe that, if they are pretty well in Fleſh, what they then add to them by a good Paſture, though it make them both look and ſell well, yet it will not make them eat ſo well, their Fleſh proving hard and very tough: Which ſome may ſuppoſe to be the Age of *Parenchyma*; and ſo it is of that ſo called. But if thoſe Beaſts be old and extreamly poor, then they feed very kindly, and will be not only very fat, but ſpend well, like young ones, and eat very tender. Of which I take the Reaſon (excluding a *Parenchyma* now) to be this: When an Ox or Cow is grown old, and in an indifferent Plight as to his Fleſh (for ſo it is called) all theſe Veſſels having been kept at that Size for the moſt Part, have contracted a Tenſeneſs and Firmneſs, and their Fibres leſs extenſive, not ſo fitted for the Reception of more unctuous Particles to relax them; and that additional unctuous Matter, which occaſions Fatneſs, is forced to ſeek new Quarter, any where (often remote from Muſcles) where it can be with leaſt Difficulty received; ſometimes to one Place, ſometimes to another, as may be ſeen in Shambles. Whereas, if there were ſuch a Thing as a *Parenchyma*, that certainly would, like a hungry Spunge, immediately ſwell up in ſeveral Parts (which without much Difficulty might be diſcovered in the Diſſection) and more eminently where it ſhould find the Pores moſt patent: And in the Diſſection of ſuch Muſcles it would be very ſtrange, not to find ſome, if not many Pieces of them in various Shapes, to the great Inconvenience of the Parts in which they are ſeated: Which yet I confeſs, I could never find in any Muſcle, unleſs it were where there had been a Contuſion, or an Impoſthume, or the like. But according to my Opinion of the *parenchymous* Parts, the Reaſon why the Fleſh of a very lean Ox or Cow, that hath got new Fleſh in a good Paſture, eats tenderer, ſeems to be this: That in a very lean Beaſt, the Veſſels deſigned for admitting and di-

ſtributing the nouriſhing Juice, are ſo near contracted, and lie ſo cloſe together, that when once they are relaxed by freſh and unctuous Nouriſhment, they extend every way in all extenſive Parts, until in a ſhort Time the whole Creature is, as it were, created anew, having got new Fleſh upon old Bones. And the Neceſſity of extream Extenſion makes all thoſe Parts that are, as has been ſaid, for the Admiſſion of Nouriſhment, ſo thin and fine, that it will make the lean Beaſt, put into a rich Paſture, eat young and tender; whereas one of the ſame Age, that never was very poor, fed in the ſame Paſture, ſhall eat hard and tough.

3. It has been obſerved, that *corpulent* Perſons, in ſome Diſeaſes that ſeize on them do fall away to Wonder, not only in the Waiſt, but in the Arms, Legs, and Thighs; and the very Calves of the Legs have been obſerved ſo flaccid and looſe, that one might wrap the Skin about the Bones. The Reaſon whereof, according to the Opinion delivered, may be eaſily rendered to be a great Conſumption of the Stock of Liquors, that in Health kept the Veſſels turgid; which Veſſels I ſuppoſe to make up thoſe Muſcles. But when the Pores are obſtructed, that the Nouriſhment is hindered (which then alſo uſes to be but ſparingly adminiſtred) and Sweats, either ſpontaneous, or forced, are large, there muſt needs be a great Expence of thoſe Liquors, the Supply being but inconſiderable; which cannot but contract all theſe Ducts of all Sorts nearer together, and make them much leſs in themſelves, meerly from Exhauſtion: Or, if there ſhould be no Sweats, the internal Heat ſpends the Spirits, and dries up the Liquors, the Conſequence whereof may reaſonably be preſumed to be this Flaccidity of Parts, and great and ſudden Change made in them; not that there is need of any *Parenchyma* to fill up theſe Muſcles, conſidering what hath been ſaid.

A Child about 6 Years old, who in Face was as large as a full grown Woman; by Dr. Hen. Sampſon. *n.* 217. *p.* 80.

XII. One *Hannah Taylor* (born in *Crouched-Friers, June* 12. 1682.) was till 3 Years old very ſickly, lean, and not able to go alone; but about *Bartholomew-tide*, 1685, ſhe began to grow ſtrong and fat, which encreaſed till the Time of her Death: She was alſo a very forward Child of Underſtanding, had her *Pubes* grown thick and long, as alſo Hair under her Armpits, and a Downineſs upon her Chin, unuſual with thoſe of her Sex, except in ſome aged Perſons.

About half a Year before ſhe died ſhe began to complain of Pains, eſpecially on her left Side, and voided Gravel often by Urine, and with Pain. Her Breath was ſtreight, as is uſual to fat People, eſpecially when ſhe went up a Pair of Stairs; yet on that very Evening before ſhe died, ſhe walked Abroad, was merry and lively, went to Bed, and ſlept as at other Times; but after Midnight awaked, cried out of a great Pain in her Side, and ſaid, Mother, I want Breath, I ſhall die; and in leſs than a Quarter of an Hour was quite dead.

The Meaſures and Weight of her Body were as followeth: Round the Breaſt a Yard and 2 Inches; over the Hips at the Navel 1 Yard 5 Inches; over the Stomach 1 Yard; her Height 1 Yard wanting an Inch; round the Thigh 1 Foot 9 ½ Inches; Calf of the Leg 13 Inches; upper Part of the

Arm 14 ½ Inches; the Wriſt 7 Inches; her Weight 95 ℔. She had a Face as big and broad as any fat grown Woman of 20 Years. Her Chin and Breaſt were ſo thick laid with Fat, that ſhe was forced to hold up her Head (or rather throw it backward) as ſhe walked. Theſe Meaſures were all taken before the Diſſection. The Thickneſs of the Fat upon the Muſcles of the *Abdomen* was 2 Inches, and not much leſs upon the *Sternum.* After the Fat was removed (which was as much as is uſually in moſt fat and grown Perſons) the *Abdomen* was yet very protuberant and round, and yet the Fat contained therein not extraordinary much, neither on the *Omentum* or *Meſentery.* Yet it was more than is uſual in well fed Perſons, and ſo much that with the Bigneſs of the other internal Parts (which were all of the largeſt Size) it made her have ſo big and protuberant a Belly. The Guts were all inflamed and thick, the Liver large, the left Kidney (where was the Seat of her Miſery) exceeding large, and Double the Bigneſs of that on the right Side; upon the Diſſection whereof there iſſued out a vaſt Quantity of Blood, both from all the Veſſels of it, and out of its *Pelvis*; and after ſeveral times ſpunging of it, yet it came flowing in from the *emulgent Artery:* A certain Argument of a great Plenitude in the *deſcending Trunk*, which cauſed the Inflammation in the *Meſentery*, and the *Nephritis* in the Kidney. Here was alſo ſome ſmall Gravel, which poſſibly had choaked up the *Ureter*; though that was not examined; but becauſe there was no Blood in the Bladder, I juſtly make this Conjecture. The Uterine Parts had nothing bigger, or more remarkable than in others of her Age. The *Teſticles* were large, but ſmooth and white, without Protuberances or Shew of Eggs. The Bladder had a purulent Matter in it. When the Breaſt was denuded of its Fat, it ſhewed no bigger than of another Child of her Age. The Cavity was totally filled with the *Lungs* and *Heart.* The *Heart* was well, and had very ſtrong Fibres, and no *Polypus.* But the *Lungs*, beſides that they were extended to fill up the whole Cavity, were annexed ſtrongly to ſeveral Parts of the *Pleura*, and had ſeveral Protuberances as big as Nutmegs filled with a Pulp like an *Atheroma*, and were in divers Places rotten and corrupted. The evident Cauſe of her Death lay in the Inflammation of the lower Parts, but the Suddenneſs thereof muſt be from ſome Impreſſion which that Inflammation made upon the Original of the Nerves moving the *Diaphragm*, *Bronchia*, and other Parts of *Reſpiration*; for her great and only Complaint was Want of Breath. Beſides, her very Face and Head were miſerably coloured with Redneſs of ſtagnant Blood. The Head was not opened.

Corpulency miſtaken for a Dropſy; communicated by Mr. Greenhill. *n.* 265. *p.* 618.

XIII. Sir *F. L.* was ſwelled mightily in his Legs, *Abdomen*, Stomach, and to his very Throat, even to Suffocation, that he died. Mr. *K——s* was ſent for to let out the ſuppoſed Waters; for his Phyſicians had treated him as in a *Dropſy*, with powerful *Diureticks*, &c. and 1 or 2 Pails were provided ready to receive the Matter; but upon opening him, there iſſued forth nothing but a Guſh of Wind. He cut 6 Inches and a half deep of *Fat* on the *Peritoneum*, and died of a *Corpulentia nimia*, being one that fed prodigiouſly.

XIV. *Ac-*

XIV. *Accounts of Books omitted.*

n. 167. *p.* 866. 1. MEdicina Septentrionalis Collatitia, ſ. Rei Medicæ nuperis Annis à Medicis *Anglis*, *Germanis*, & *Danis* emiſſæ Sylloge & Syntaxis; Opera *Theophili Boneti*, D. M. *Genevæ* 1685. in Fol.

n. 105. *p.* 113. 2. Anatome Corporis Humani, conſcripta ab *Isbrando de Diemerbroeck*, M. D. *Ultrajecti* 1671. in Quarto.

n. 178. *p.* 1309. 3. *Godefridi Bidloo*, M. D. Anatomia Humani Corporis. *Amſtel.* 1685. in Fol.

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n. 121. *p.* 513. 11. The *College of Phyſicians* Vindicated, and the true State of Phyſick in this Nation faithfully repreſented, *&c.* by *Char. Goodall*, M. D. *Lond.* 1676. in 8°.

n. 99. *p.* 6175. 12. Apologema pro Urinis Humanis; Auth. *Antonio Eygel*, M. D. *Amſtel.* 1772. in 8°.

n. 154. *p.* 425. 13. De Urinis, Pulſibus; de Miſſione Sanguinis; de Febribus; de Morbis Capitis, & Pectoris. Opus *Laurentij Bellini*. *Bononiæ*, 1683.

n. 171. *p.* 1023. 14. *Dav. Abercrombij*, M. D. de Variatione ac Varietate Pulſus Obſervationes. Acceſſit ejuſdem Authoris nova Medicinæ, tum Speculativæ tum Practicæ, Clavis, *&c.* *Lond.* 1685. in 8°.

n. 76. *p.* 2289. 15. *Joh. Bapt. Sylvatici* Inſtitutio Medica de iis qui Morbum ſimulant deprehendendis. *Francofurti ad Mœnum* 1671. in 12°.

n. 107. *p.* 162. 16. *Tho. Bartholini* de Anatome Practica ex Cadaveribus Morboſis adornanda Conſilium. *Hafniæ*, 1674. in 4°.

n. 50. *p.* 1018. 17. Obſervationes Medicæ *Mich. Leyſeri*, *Henr. a Moinichen*, *Mart. Bogdani*, *Jac. Seidelij*, è Muſæo *Tho. Bartholini*. *Hafniæ*. in 8°.

n. 54. *p.* 1094. 18. *Theodori Kerckringij*, D. M. Spicilegium Anatomicum; continens Obſervationum Anatomicarum rariorum Centuriam unam, nec non Oſteogeniam Fœtuum. *Amſtel.* 1670. in 4°.

n. 125. *p.* 621. 19. Two Treatiſes; the one, Medical, of the Gout, by *Herman Buſchof* Senior, of *Utrecht*; the other, partly Chirurgical, partly Medical, con-

taining ſome Obſervations and Practices relating to ſome extraordinary Caſes of Diſeaſes in both Sexes; by *Hen. Van Roonhuyſe*; *Engliſhed* out of *Dutch*. *Lond*. 1676. in 8°.

20. *Caroli Drelincurtij* Experimenta Anatomica; quibus adjecta ſunt plurima Curioſa ſuper Semine Virili, Fœmineis Ovis, Utero Uterique Tubis, atque Foetu. *Lugd. Bat*. 1684. in 12°. *n.169. p.945.*

21. Dr. *Liſter*'s Exercitationes Medicinales. *n. 222. p.322, 326.*

22. *Medicina Statica*, or Rules of Health; originally written by *Sanctorius*; now *Engliſhed* by *J. D. Lond*. 1676. in 12°. *n. 136. p. 921.*

23. Trichiaſis admodum Rara. *Lond*. 1684. *n.170. p. 986.*

CHAP. II.

The HEAD.

I. S. *Malpighi* pretends to have diſcovered, that the exterior and ſofter Part of the Brain, doth not cover only the *Corpus Calloſum*, but is alſo inſerted into it in many Places; That the *Corpus Calloſum* is nothing but a Contexture of ſmall Fibres, iſſuing from the *Medulla Spinalis*, and terminating in the ſaid exterior Part of the Brain. And theſe Fibres, he ſaith, are very manifeſt in the Ventricles of the Brain of Fiſhes. He pretends, that as Half, or at leaſt a Third, of the Blood of an Animal is conveyed into the Brain, where yet it cannot be conſumed, the fineſt *Serum* of this Blood is filtrated through the exterior Part, and then entring into the Fibres of the Brain, is thence conveyed into the Nerves; which he affirms to be the Reaſon, that the Head is ſo often found full of Water, when the Brain hath received a Wound, or an Alteration by ſome Diſtemper.

Diſcoveries concerning the Brain; by S. Malpighi. *n. 27. p. 491.*

II. 1. Here was lately produced an Infant come to Maturity, having inſtead of a Head and Brains, a Maſs of Fleſh like any Liver, and was found to move. This Fœtus occaſioned a Queſtion for the *Carteſians*, How the Motion could be performed, and yet the *Glandula Pinealis*, or *Conarium*, be wanting; nor any Nerves viſible, which come from the Brain? The Marrow in the Spine was of the ſame Subſtance. It lived four Days, and then died.

A living Birth without a Head, at Paris; *by* M— *n. 26. p. 480.*

2. In *November* 1673, I was called to a ſick Woman, brought to Bed that very Day I went to ſee her. After I had preſcribed the Phyſick I judged neceſſary for the Mother, I aſked for the Child, which died, I heard, as ſoon as it was born. The Body of it appeared outwardly very well formed and very fat; but the Head was ſo deformed, that it frighted all that were preſent. It had no Front; the two Eyes were on the Top of the Face, very big, and almoſt without any Orbit to lodge them in. The upper and hind Part of the Head was red like coagulated Blood, and re-

An odd Fœtus without a Brain; by M. Denys. *n. 99. p.6157.*

ſembled the Bottom of a Calf's Head when cut and ſevered from the *Vertebræ* of the Neck. I had the Curioſity to examine this red Fleſh, and I found under it a Bone, that was not a hollow Skull, but a ſolid Bone in the Form of a ſmall Oyſter. I had it opened every Way, but I found no Hollowneſs nor *Brains* in it. This Bone was only faſtened before to the Bones of the Face, and not behind to the *Vertebræ* of the Neck; ſo that the Marrow of the Back-bone had no Communication with the Head. I purſued the Optick Nerves, and loſt them in this Bone, which was in Lieu of the *Cranium*, and was not at all ſpungy, but very hard. It ſeems to me ſomewhat extraordinary, that a Child ſhould be able to live nine Months without *Brains*; for I was informed, that it was very lively and briſk in the Mother's Belly, but died as ſoon as it came into the Air.

A Child born alive without a Brain; by M. Le Duc. *n.* 226. *p.* 457.

III. 1. *April* 3. 1695, I was called to a Woman aged about 28 Years, 6 Months and a Half gone in her third Child, who fell from a Stair about 8 Days before, and I happily delivered her of a male Child that lived half an Hour. He was big and ſtrong, and all the Parts of the Body well proportioned, as they ought to be naturally, except the Head, the hinder Part whereof was flat, as if it had been taken off with the Stroke of ſome Weapon, even to the *Os Sphœnoides*; there was neither *Brain*, *Cerebellum*, nor *Medulla Oblongata*: The Cavity which ought to contain theſe was very ſuperficial; I found in their Place a black and livid Subſtance, covered with a Membrane, which may be the *Dura* and *Pia Mater* joined together: This Subſtance had coloured the *Os Petroſum* and other Bones of a deep red Colour. I thruſt a Stillet, or Probe, into the Cavity of the *Vertebres*, where ought to be placed the *Medulla Spinalis*, but found no Oppoſition; for in Effect, it was filled with a red ſtinking Liquor, contained in the Membranes of the *Medulla Spinalis*. The Viſage of this Child was a little deformed, becauſe of the want of the *Cranium*, which might have been communicated to the Bones, as yet tender, that ſuſtained the Skin of the Face. The Eyes were in great Motion during the Time it lived, but we found nothing in the Place of Muſcles and Nerves but Skins and Filaments very ſmall, and not capable of Contraction, mixed in a rotten Humour; ſo that this great Motion might rather proceed from the Motion of the *Palpebræ*. There has paſſed under my Hands three Subjects like unto this, all Male, and who lived ſome Time.

By Dr. Ch. Preſton. *ibid.* *p.* 439.

2. I was preſent when this extraordinary Child was diſſected. We found the external Parts all well proportioned, except that it wanted the *Cranium*, *Cerebrum*, and *Cerebellum*; the Viſage was a little deformed; it had Eyes and Ears like a Monkey, and all over the Body was more hairy than ordinary. In the Place of the *Brain* we could diſcover nothing but a Subſtance like congealed Blood, covered with a Membrane; and inſtead of the *Optick Nerves* we only found ſome ſmall Filaments.

But this *Examen* not being ſatisfactory to me, I carried the Subject to M. *Du Verney*, *Profeſſor* of *Anatomy* in the *Royal Garden* at *Paris*. He traced the 8th and 9th Pairs of *Nerves* and *Intercoſtal*; and having cut up the Canal of the *Vertebres*, diſcovered the *Medulla Spinalis* all along the Cavity, and traced all the *Vertebral Nerves* proceeding therefrom; as alſo the *Sciatick Nerve* conſiderable enough. It is true, the *Medulla Spinalis* was not here of that Conſiſtence as in adult Perſons; but one could with ſome Pains obſerve all the four Tunicks, and the two Subſtances, as in the *Brain*, to wit the *Cortical* or Glandulous Subſtance, and the *Fibrous* or white, but with this Difference, that the brown Subſtance is exterior in the Brain, but interior in the *Medulla Spinalis*; for it is as it were a third *Brain* contained in the Canal of the *Vertebræ*, ſo framed for its Defence; for there are *Meninges* as in the *Brain*, Sinus's and Cavities, which may paſs for *Ventricles*: In a Word, one can ſay all of it that they can of the *Brain*, and more, for it appears more ſenſible and neceſſary for the Life; for you can take the *Brain* or *Cerebellum* from an Animal, and yet the Animal ſhall live ſome Time thereafter; but a Wound or Compreſſion of the *Medulla Spinalis* will cauſe ſudden Death. This is confirmed by ſeveral Anatomical Experiments. 1. M. *Du Verney* 1673, took the *Brain* and *Cerebellum* from a Pigeon, and in Place thereof filled the *Cranium* with Flax, notwithſtanding which it lived ſome Time, and ſearched for Aliment, did the ordinary Functions of Life, and had the Uſe of Senſe. 2. M. *Chirac*, *Profeſſor* of *Anatomy* at *Montpelier*, took the *Brain* from a Dog, yet he lived ſome Time, but when the *Cerebellum* was taken out, he died immediately; but he has obſerved, that by blowing into the *Lungs*, the Animal has lived an Hour, although wanting the *Cerebellum*. 3. He took from another Dog half of the *Cerebellum*, but he died immediately. 4. After he had taken half the *Brain* from a third Dog, the Dog continued to have the Motion of all the Parts, and could walk about; and even after he had taken away all the *Brain*, he had yet Senſe and Reſpiration. 5. He ſeparated the *Medulla Oblongata* of a fourth Dog from the *Medulla Spinalis*, by introducing a Pair of Sciſſars between the firſt *Vertebræ* and the *Os Occipitis*; the Dog had died immediately, but by blowing into the *Lungs*, the Motion of the *Heart* continued, and the Animal could move his Body, 6. He took the *Cerebellum* from a fifth Dog, but he lived 24 Hours, and his Heart beat well.

All theſe Experiments let us ſee, that an Animal may live ſome Time, tho' imperfectly, wanting the *Brain*, and even the *Cerebellum*; but there is no Experiment where ever they lived wanting all; therefore I humbly conceive, the *Medulla Spinalis* was not here wanting, for it has here ſupplied the Defect of the *Brain* and *Cerebellum*, and the Animal Spirits have been ſeparated and diſtributed for continuing the Circulation of the Blood. For it is to be conſidered, that although the *Intercoſtal Nerve* and *Eighth Pair* have their Origin in the *Medulla Oblongata*, yet after their Entry into the Cavity of the Breaſt, they are united with Branches from almoſt all the *Vertebral Nerves*, and with them make up ſeveral *Plexus's*, and from thoſe *Plexus's*, ſeveral Branches are emitted that go to the *Heart*, and other Parts, ſufficient for the continuing the Circulation of the Blood, which has occaſioned ſome to run into a Miſtake, thinking the Circulation is to be explained ſome other way, than by the Influx of the Animal Spirits into the Nerves; which they endeavour to prove by an Experiment on a Dog, of tying the *Intercoſtal* and *Eighth Pair* of *Nerves*, before they enter the Cavity of the Breaſt, and yet the Dog ſhall live two or three Days thereafter. But except they can tie all the *Vertebral*

Nerves, or at leaſt tie the *Nerves* at their Entrance into the Heart, their Experiment is not ſo convincing: And the Symptoms which ordinarily happen, even upon tying the *Intercoſtal* and *Eighth Pair*, is an evident Proof of the contrary, for the Animal is taken immediately with *Convulſions*.

I ſhall not pretend to determine after what Manner this want of the *Brain* was ſupplied, or whether the *Brain* and *Cerebellum* were carried off by the ſtrong Force of Imagination, or by ſome Accident, or Corruption: But whatever of theſe obtain, I am apt to believe that all the Parts of this *Fœtus* were once entire, and perfectly framed. And the tracing of the 8th and 9th *Pair* of *Nerves* and *Intercoſtal*, which take all their Origin from the *Medulla Oblongata*, ſeems to be a Proof of it; and how far the Force of Imagination goes, and what Influence it has upon Children, we have ſeveral Inſtances. We have alſo ſeveral Obſervations of like Caſes with this Infant, delivered to us by M. *Mauriceau*, and M. *Peu*, and other Authors.

An Infant with the Brain depreſſed into the Hollow of the Vertebræ *of the Neck; by Dr.* Edw. Tyſon. *n.*228. *p.* 533.

4. Some Years ago, I was called to ſee a Birth which was very ſurpriſing. The Midwife informed me, that the Child was alive, but died in the Birth, or a little before. I found it well grown; all the Limbs and Body well proportioned, and plump; the Face well featured, only from the Eye-brows; the *Skull* was perfectly depreſſed down to the *Os Sphænoides*, or Baſis of the *Calvaria*; ſo that it had no Forehead at all. I opened the *Cranium* in ſeveral Places, before I could find any *Brain* at all; but at length I obſerved, near the paſſing out of the *Medulla Oblongata* to the *Medulla Spinalis*, a ſmall Quantity of the *Brain*; the whole might be included in a Walnut-ſhell; it was covered over with a bloody Matter. But thruſting down my little Finger through the *Foramen* where the *Medulla Spinalis* paſſes, I obſerved a very large Cavity in the Hollow of the *Vertebræ* of the Neck, ſo that I could turn my Finger round a good Compaſs there. This large Cavity I found to be filled with a Subſtance like the *Brain* or *Medulla Spinalis*, or both; but far larger than the *Medulla Spinalis* itſelf could be in ſo ſmall an Infant. This eaſily made me to conclude, that the *Brain* muſt be preſſed down hither, which I was the more induced to believe, becauſe the Mother informed me, that when ſhe was with Child, ſhe received a conſiderable Bruiſe in her Belly.

How far the *Medulla Spinalis* may anſwer the Office of the *Brain*, eſpecially in the Embryo's, where there is no Exerciſe of the Senſes, nor the Imaginative Faculty, will be no great Difficulty to apprehend; ſince for the Functions of Life in them, the Spirits generated even in the *Medulla Spinalis* (for it has a Glandulous Subſtance too, but inwards) may ſuffice; eſpecially in this Inſtance, where I do ſuppoſe a great Part of the *Brain* to be detruded (by the Bruiſe the Mother received) into the Hollow of the *Vertebræ*; and do quære, whether in thoſe Inſtances that are given of Births of Infants without *Brains*, there might not be the like Accident of the *Brain*, or the principal Parts of it being depreſſed into the *Vertebræ*; which in Embryo's (before hardned into Bones) are Parts extendible.

A Child born without a Brain; by Mr. Buſſiere. 1. *p.*141.

5. In *October* 1698, a *French* Woman, living at *Dung-hil* of a good Complection, and in perfect Health during all the Time of her being with Child, was brought to Bed of a Boy: He was tall, well ſhaped, and very ſound. And though it be uncertain whether he was born alive, yet the Mother aſ-

ſured me, that ſhe felt him ſtirring an Hour before, and indeed the good Condition of his Body ſufficiently proves that he was alive. The Skull was unequal, and the Skin thereof, though full of Hair, a little redder than the reſt of the Body. The *Coronalis* Bone laid flat upon the *Sphenoides* Bone, which made the Eyes look as if they had been placed in the Top of the Forehead. The *Squamoſa* Part of the *Temporal* Bones was wanting, there being but the *Os Petroſum* which was in its natural Place, and in which were the Organs of the Senſe of Hearing in very good Order. There was no *Parietal* Bones, nor any thing equivalent. Of the *Occipital* Bone there was but the Baſis which joineth to the *Sphenoides*, in the Middle whereof was the great Hole through which the *Medulla Oblongata* commonly paſſeth, all the upper Part of this Bone being wanting, without any Mark of having been corroded or gnawn, the Edges of which were very ſmooth. All the upper Part of the Bones of the Skull being wanting, the Skin had no other Support but its Baſis, which was the Reaſon why the Top of the Head was very unequal and rough. No Brain at all was found, nor any Mark in the whole Extent of the Skull that there had been any, there being no Space left between the Baſis of the Skull and the Skin to contain it; there was no *Dura Mater* neither, the Bones being covered only with a very thin Membrane. Neither the *Carotides*, nor the *Vertebral* Arteries did penetrate the Skull, but by ſmall Twigs, ſpread in the thin Membrane. The Beginning of the *Medulla Spinalis* was under the 4th *Vertebra*, like a ſmall Stump wrapped up in the *Dura Mater*; the *Medulla* was very ſound, and of the uſual Bigneſs; and all the *Nerves*, which parted from it, were in their natural Order. The Eyes were well ſhaped, and all the Parts belonging to them in their natural Situation: But all the *Nerves* did terminate themſelves in the Holes of the Skull, through which they commonly paſs; they did reach no further, nor had any Communication with any other. The Tongue was very freſh, and doubtleſs had performed the Deglutition to make the Child ſwallow the Colliquamentum, of which there was a good Quantity in the Stomach. The *Larynx*, and all the Parts of the Throat were, as the reſt of the Body, in a good Condition.

One Hemiſphere of the Brain ſphacelated, with a Stone in it, by Dr. Edw. Tyſon, *n.* 228. *p.* 535.

6. *Dec.* 12. 1688, I was deſired to be preſent at the Opening of Mr. *A.* About 2 Months before, he had received, in a Quarrel, a great Bruiſe on his Head. After ſome time he took his Bed, and complained of a moſt violent Pain in his Head. He ſometimes vomited; ſometimes was in *Convulſions*; ſometimes in the Day he would have a great *Stupor* upon him; and when he waked he would be delirious. His Swallowing was difficult, and he would grin his Teeth: His Eye-ſight afterwards failed him, and he loſt his Memory; and upon the leaſt Motion of his Body, would faint away, and in the whole Courſe of his Diſtemper was Feveriſh. Upon opening his Head, I obſerved the Blood-Veſſels of the *Meninges* very much extended, and the greateſt Part of the left *Hemiſphere*, or Side of the *Cerebrum* or Brain to be perfectly rotten or ſphacelated, not having the leaſt Conſiſtency, but purulent and ſoft: Nor could I diſtinguiſh the *Medullary* Subſtance from the *Cinericeous*; but all of a dark reddiſh Colour. In the *Ventricles* of the *Brain* I

obſerved a great deal of Water: And upon Diſſecting the *Protuberantia Orbicularis*, called the *Teſtis*, on the left Side, which was as big as a Nutmeg, I found in a purulent Matter there a Chalky Stone, about the Bigneſs of a Cherry-ſtone, but flat, and not very thick; and in taking it out I found it friable.

An Hydrocephalus; *by Mr*. Friend. *n*.256. *p*.318.

III. The outward Dimenſions of this Head, before it was opened, were as follows; *viz.* From the *Eye-brows* over the Crown to the Nape, 23 Inches; the Circumference from the Nape round the *Oſſa Bregmatis*, 26; but round the *Os Frontis*, 24; from Ear to Ear, over the Crown, 19; from the Eye-brows to the Chin, 4; from one Extremity of the Eye-brows to the other, 4 $\frac{1}{2}$; from the Chin to the *Coronal* Suture, 7 $\frac{1}{2}$; Circumference from the Chin round the Crown, 30; from one Extremity of the Ear backward to the other, round the Noſe, 12; and round the Nape, 6 $\frac{1}{2}$; from Temple to Temple over the Forehead, 11; Circumference of the Head round the *Os Frontis* and *Occipitis*, 29; Circumference of the Neck, 9 $\frac{2}{3}$; Length of the Neck, 2; Length of the Body, 33; Circumference of the Thorax, 18; Length of the Foot, 4 $\frac{1}{2}$; from the middle Finger's End to the *Acromion*, 12 $\frac{1}{2}$; Circumference of the Arm, 5; of the Calf, 5 $\frac{1}{2}$; of the Thigh, 8.

After the Integuments were removed, the Top of the *Cranium* appeared ſoft and membranous; the Extent of the Membrane from one Temple to the other was 8 Inches; between the *Parietal* Bones, 3 $\frac{1}{2}$; from the *Os Frontis* to the *Os Occipitis*, 12. In the Middle, juſt upon the Crown, lay a Bone (in ſome Places a little cartilaginous) 5 Inches long, and 1 broad, joined to the Membrane on every Side, of the ſame Thickneſs with the reſt of the upper Part of the *Cranium* that was Bony, which was extreamly thin every where, and the *Laminæ* lay ſo cloſe, that in many Places no *Diploe* could be diſcerned. The Membrane was as thin as the *Pericranium*, which yet was eaſily divided from it. None of the Sutures were entirely cloſed, thoſe of the upper Jaw very looſe. In the *Temporal* and *Lambdoidal* was an infinite Number of the *Triquetra Wormiana*, all which had ſo many diſtinct Sutures. Upon piercing the *Dura Mater*, a great Quantity of Water flowed out; it lay as well between the *Dura Mater* and the *Pia*, as in the *Ventricles* of the *Brain*. The Liquor was thin, pale, and inſipid; there was taken out 5 Quarts of it. The *Dura Mater* was firm and entire, of its uſual Thickneſs, and ſtuck very cloſe, as well to the Membranous, as to the Bony Parts of the *Cranium*. All its Proceſſes and Sinus's were ſingular, the 4th Sinus ſomewhat larger than ordinary. A very large Vein of the *Dura Mater* entered the *Longitudinal* Sinus, directly forwards towards the *Criſta Galli*, contrary to the Courſe of the Blood. The *Pia Mater* was very much diſtended, and ſeemed to be ſtretched as much as it could bear. It lay ſmooth and equal upon the Surface of the *Brain*, there being neither any Circumvolutions in the *Brain* for it to go between, nor any Partition to the *Corpus Calloſum*, though there was a large *Falx* in the *Dura Mater*. The Lateral *Ventricles* were very thin: Towards the *Cerebellum* their upper Part was quite waſted, ſo that nothing was left to cover the Cavity in that Place but the

Pia Mater. This was ſo thin, that in ſtooping down the Head to empty the Water, it broke, and hindred us from knowing exactly how much Water the Lateral *Ventricles* contained; but by their Cavity, which was very large, one might gueſs they held, at leaſt, a Pint each. The 3d and 4th *Ventricle* had ſome little Water in them, but were ſcarce larger than uſual. The *Brain* had all its Parts plain and entire, though its Subſtance in moſt Places was but very thin and looſe: About the *Corpora Striata & Thalami Nervorum Opticorum* it was tolerably thick, and firm enough, though nothing to what it is in a natural State. The *Cerebrum* and *Cerebellum*, when laid out in their right Poſition, were 11 Inches long; the *Cerebrum*, croſs the Lateral *Ventricles*, 9 broad. After all the Water was taken out, both of them weighed 1 ½ ℔. The *Corpora Striata* and *Thalami Nervorum Opticorum* were very ſmall in all their Dimenſions; withinſide towards the *Ventricles* they were wrinkled, and lay in Folds, like thoſe in the inner Coat of the Stomach. In the *Corpora Striata* there were no *Striæ* diſcernable. The *Plexus Choroides* was very ſmall; the *Glandula Pinealis* was ſomewhat bigger, but leſs compact than ordinary; the *Nates* were red and large, 2 Inches long, 1 broad, and 1 thick; the *Teſtes* were not diſtinguiſhed from them by any Protuberance, they ſeemed rather to be a Production into which the *Nates* leſſened by Degrees, like a Sugar-loaf. The *Cerebellum* was very firm every where, and did not much exceed its natural Bulk. The *Medullary* Trunk, which ſends out thoſe little Branches like Trees, was thicker and harder than uſual; the Branches were not ſo much diſpoſed like thoſe of a Tree, but went rather in ſingle oblique Lines, like ſo many Rays drawn from a Point. The *Nerves* were all regular and plain, only the *Olfactory* were very ſmall; the *Optick* did not join before they entered the Orbits. The *Rete Mirabile* was very large, ſo was Dr. *Ridley*'s *Circular Sinus.* On the Right-ſide were two *Carotid Arteries* (the *Intercoſtal Nerve* lay between them) they entered the Skull at the ſame Hole. The Trunk of the *Vertebral* (where thoſe Arteries unite) was extreamly big and full of Blood. The Veins were neither larger, nor more than uſual. Upon the *Brain*, over the *Lateral Ventricles*, I could eaſily diſcern 3 or 4 *Lymphaticks*, but they were too ſmall to be traced.

The Mother of this Child brought it to *Oxford* for a Sight. She ſaid, ſhe was 3 Weeks in Travail, and at laſt was forced to have the *Vagina* ript for its Paſſage. The Child was 2 Years and 6 Weeks old, it could ſpeak a little, could not go, nor hold up its Head; it was always merry, never ſubject to Drowſineſs, Pain in the Head, Want of Appetite, or Indigeſtion: Its Sight was ſomewhat dim, and its Smelling but dull. It never had any Illneſs, only 2 or 3 Days before it died it was very much troubled with the Gripes, and upon opening the *Abdomen*, the Guts were found extreamly ſwelled with Wind. Every thing elſe was as it ſhould be.

The Diſſection of a Lady who died of an Apoplexy; by Dr. Will. Cole. *n.* 173. *p.* 1068.

IV. The Lady *N.* had been troubled for ſeveral Years with Hypochondriack and Hyſterick Symptoms (as they are commonly called) attended frequently with a profuſe Hemorrhage from the Noſe, ſome Years before her Death. In order to remove thoſe Complaints and prevent their bad Conſequences, beſides other Remedies, ſhe had frequent recourſe to Bleeding. The Day before ſhe died, ſhe was threatened with her uſual Hemorrhage, which ſhe endeavoured by all poſſible Means to prevent, having narrowly eſcaped with her Life not long before, from the immoderate Quantity of Blood which ſhe loſt that Way. The Remedies ſhe uſed were but too ſucceſsful in preventing the Bleeding, and as they anſwered that Intention, ſhe thought herſelf out of all Danger the very Day of her Death, which was the tenth Day of *May* 1679. But the fatal Cataſtrophe was juſt at Hand. For after ſhe was gone to Bed, ſhe was ſuddenly ſeized with a violent Pain in her Head, to relieve which (her Speech beginning preſently to fail her) ſhe ordered a Surgeon to be called immediately to Bleed her. The Surgeon being at a Mile's Diſtance from the Lady's Houſe, he did not get there till after her Death, which happened within half an Hour from the Time ſhe was firſt ſeized.

I was deſired to be preſent at the opening of her Body, together with Mr. *Tomkyns*. And here we had Occaſion to obſerve, that her Liver, which for thirty Years had been pronounced Schirrous by almoſt all the moſt eminent Phyſicians, whom ſhe conſulted, (and they were of the ſame Opinion concerning the Spleen) had not the leaſt Appearance of any Obſtruction about it. It was indeed very large, and therefore, in a lean Perſon eſpecially, by diſtending the Hypochondrium more than uſual, might eaſily deceive thoſe who, according to the old Doctrine, lay the Blame of all Hypochondriack Complaints upon Obſtructions of the *Liver* and *Spleen*. We obſerved however, that there was no Bile to be found neither in the *Gall-bladder*, which was very much contracted, nor in the Biliary Veſſels ſcattered up and down the *Liver*, (which offered themſelves to View) nor were theſe even almoſt turgid with it. But in the Cavity of the *Gall-bladder* were found fourteen Stony Concretions, the greateſt Number of which, were about the Bigneſs of a Pea, two or three of them a little larger of a flat round Figure, blackiſh externally, and ſmooth, reſembling Bezoar, after they were expoſed a little while to the Air, but at firſt Sight moſt like Pills of Aloes. Within they were yellowiſh, with a ſmall Cavity in the Middle and very brittle. The *Spleen* appeared likewiſe very ſound, and of the uſual Size. The *Pancreas* too ſeemed free of any Obſtruction. There were neither Stones nor Gravel to be obſerved about the Kidneys, though from the frequent Pains in the Loins, ſhe imagined herſelf ſubject to that Diſeaſe. The Uterus too was every Way ſound, though a good many of the Symptoms in ſuch Patients are commonly enough aſcribed to it.

Upon opening the *Thorax*, the *Lungs* of the Right-ſide adhered firmly to the *Pleura*, for the Space of four Inches, and in ſeveral Places, eſpecially towards the Margine of the Lobes, they looked as black as if they were about to mortify. The *Heart* was quite ſound, and perhaps it may be worth the while to take Notice, that the Baſis of it was ſurrounded with a ſufficient Quantity of Fat, though the reſt of the Body was very much emaciated.

The *Cranium* being laid open, the Blood Veſſels diſtributed to the Membranes of the Right Lobe of the *Brain* (eſpecially thoſe of the *Pia Mater*) were obſerved to be quite turgid with Blood. And having cut through the Membranes in that Part where her firſt Complaint was, a great Quantity of ſerous Blood flowed out, which being evacuated, and the Subſtance of the Brain cut into with a Knife, there appeared a large Cake of clotted Blood, which had formed for itſelf a Cavity there, and when taken out, it weighed about an Ounce and a half. But there was no Blood extravaſated in the *Ventricles*, nor any where elſe between the Membranes, nor were the Blood Veſſels in the Left Lobe at all turgid. In this Diſſection of the Brain, which we were obliged to perform by Candle-light, and were pretty much hurried beſides, we could find nothing elſe amiſs about that *Viſcus*; although from the various Symptoms which ſhe had been a long Time ſubject to (ſuch as Palpitations, Anxieties, Contractions and Pains in the Joints and Muſcles, and Convulſive Complaints) one might upon good Grounds ſuſpect, that the Nervous Fluid was not a little vitiated. And here perhaps this Corollary may be deduced, that the Depravity of the Juices contained in the Body, is not always owing to a Fault in the containing Parts, or the Organs of Secretion, but ſometimes (if not for the moſt Part) ought to be imputed to their own proper Degeneracy and Dyſcraſy. The Brain, with the Cerebellum, taken out of the Skull, and waſhed free from the Blood, weighed two Pounds fourteen Ounces *Averdupois* Weight.

The Death and Diſſection of S. Malpighi; *by* Jean Marie Lanciſi. *n.* 226. *p.* 467.

V. The incomparable *Malpighi*, who induſtriouſly applied himſelf to very ſerious Studies, was of a good Habit of Body, and had ſeen 66 Years; but he had frequent Sickneſſes; ſharp Vomitings did torment him for 20 Years; he was troubled with the Gravel, a Hæmorrhagia in the Kidneys, a Rheumatiſm Fluxious; which with their troubleſome Conſequences, augmented his Infirmities. Scarce had theſe Evils given him ſome Reſpite, when a cruel Palpitation of the Heart, with an unequal Pulſe came upon him. Moreover, 4 Years before his Death a ſharp and biting Sweat failed not, all the Summer, to trouble him every Night. Pope *Innocent* XII. having called him to *Rome* to make him his chief Phyſician, he began the firſt Year to loſe his freſh Colour; in the ſecond, he voided many Stones without much Pain; and in the third, which was the laſt of his Life, he found himſelf oppreſſed, during the Winter, with a Difficulty of Breathing.

His Health being thus inſenſibly undermined, and a Bilious Looſeneſs returning ever and anon, he was at length ſeized with a *Vertigo*, a Loſs of Speech, and a Contorſion of the Mouth (*Spaſmus Cynicus*) and a Palſy of half the Right-ſide. And though there was Appearance that he was out of Danger by Bleedings, Purges, Diureticks, and Antapoplectick Medicines, yet one might ſee, by his melancholy Countenance, but eſpecially his want of Memory, that there was lodged in his Brain ſome melancholy Humour. Therefore, perceiving his End drawing near, he ſigned with his Hand 3 Days before his Death, his Poſthumous Works, which he had ordered to be delivered to his Collegues of the *R. Society* at *London*. Then having confeſſed himſelf with great Humility, he attended generouſly, and with Faith in God, the Death which appeared to him certain, and not far off. And on the 28th of *Nov.* 1696, a terrible *Apoplexy* finiſhed, in the Space of 4 Hours, this ſo precious Life.

This Learned Man foreſaw that he ſhould end his Days by an *Apoplexy*, and therefore forbad his Friends to open his Body till 30 Hours after his Death; for he knew well enough, that ſome who ſeemed dead on a ſudden have revived ſome Hours after. When he was opened, we found the Bladder of Gall abounded with a black Gall; the left Kidney had nothing amiſs; but the Right was twice as little, and had its *Pelvis* twice as big; which diſcovered the Cauſe of the eaſy Deſcent of the Stones. We found in the Bladder a little Stone that ſeemed to have fallen into it a few Days before. The Lungs appeared withered, with ſome Mark of Corruption on the backſide. The Heart was bigger than ordinary, and the Sides of the left *Ventricle* felt harder and thicker in ſome Places than others; yet there was no *Polypus* found in it.

The *Right Ventricle* of the *Brain* contained almoſt two Ounces of extravaſated Blood, and the *Left Ventricle* was ſwelled with a thick and yellow ſort of Phlegm, which weighed more than an Ounce. Moreover, the *Dura Mater* ſtuck cloſer to the *Skull* than is uſual. This proves, that the *conglobated* Glands in the whole Body had thrown into the Maſs of Blood an acid Lymph, and that the *conglomerated* Glands of the *Hypochondria*, eſpecially thoſe of the Liver, had thrown into it a melancholy Humour, and that theſe two Sorts of Humours being carried into the Veſſels of the *Brain*, had diſpoſed the Blood to coagulate there; and that having there corroded and broken the *Tunicles*, which ſerved for a Stop to them, they had run into the Cavities, where they cauſed Death without a Remedy.

The Diſſection of a Boy, who died ſuddenly; by Dr. Cha. Preſton. *n.* 224. *p.* 362.

VI. Being called to the Diſſection of a Boy, about 9 Years old, who died ſuddenly, being taken ill with a Fit of Vomiting a little before his Death, we diſcovered the left *Teſticle* out of its natural Place, drawn up above the *Aponeuroſe* (or Holes of the three Muſcles of the *Abdomen*, which give Paſſage to the Spermatick Veſſels in Men that go to the *Teſticles*, and to the round Ligament of the Matrix in Women) the Bladder was extreamly diſtended and full of Urine; in the Stomach we found a Worm of about 9 Inches in Length, and a Line and a half Broad, as alſo a kind of ſlimy Matter; the Liquor contained in the Stomach was Black; but perhaps it might have that Colour from ſome Remedies preſcribed againſt his Vomiting. The Lungs were tied to the *Pleura* on the Right Side, but were free on the Left; in the Left there was an Inflammation of the *Pleura*, with ſome Matter; as alſo an Inflammation of the external *Tunick* of the *Lungs*. In the left *Ventricle* of the *Heart* we found a large *Polypus*, which filled the *Vena Pulmonaris*, and entered the left Auricle, about 8 Inches in Length, and two Fingers broad. In the right *Ventricle* there was alſo a *Polypus* of about an Inch in Length, which was ſo big that it almoſt ſtopped the Entrance of the Blood into the *Vena Cava Aſcendens*. Laſtly, In the

Brain we found alſo a conſiderable *Polypus* in the *Sinus Longitudinalis.* All other Things were according to Nature.

The Falling-Sickneſs; by Dr. Turberville. *n.* 167. *p.* 839.

VII. I had a Gentlewoman my Patient, who was much troubled with the *Falling-ſickneſs:* In her Water I ſaw a great Number of ſhort Worms, full of Legs, and like *Millipedes.* I gave her two or three Purges, firſt with *Pil. Agaric.* and *Rhubarb*; but I ſtill perceived in every Water was brought me, 8 or 10, or more of the Worms: They appeared lively and full of Motion; and the Fits continued daily. At laſt I gave her half an Ounce of *Oxymel Helleboratum* in Tanſy-Water, which wrought well, and was ſucceſsful; ſo that ſhe had a compleat Cure.

A Periodical Palſy; by Dr. Will. Muſgrave. *n.* 242. *p.* 257.

VIII. In *Aug.* 1687, I was deſired by a poor Woman at *Aſtrop-Wells,* to look on her Daughter. They came from *Stow* in *Glouceſterſhire* (as they had often done before) for Work. The Daughter was about 21, of a ſanguine Complexion, and as to private Matters well enough: She had been for ſeveral Days leſs active than uſual; and after that, had (a Week before I ſaw her) loſt her Speech, and the Uſe of her Legs; ſhe had little or no Senſe of Feeling in them, and the left Leg was drawn up as in a violent Cramp. Her ruddy ſanguine Look directed Bleeding; but that did not relieve her. I then gave her Spirit of *Sal. Armon. Succinated,* Steel with Gentian, Amber, Caſtor, and other warm Cephalicks. A Bliſter was laid on her Neck. A Bath (of Wormwood, and other hot Herbs) prepared for her Legs; *Ung. Martiatum* uſed to anoint them after Bathing. By theſe Means ſhe was, in the Space of three Days, able to ſpeak again; and in a little Time, by the Help of Crutches, able to go. But then omitting the Medicines, though but one Day, ſhe loſt her Speech again; and returning to them (eſpecially the Spirit) recovered it as ſoon. When not able to ſpeak, ſhe had a manifeſt Alteration in her Face; the Strength and Tonick Vigour of it abated; her Eyes grew dull, her Lips pale. I have, in this Juncture, given her thirty Drops of the Spirit: In the Space of two Hours the Change has been ſurprizing; her Eyes have quickened, a Colour came over her Face, her Speech returned.

In *July* 1688, her Mother brought her to me again, and told me, That after the Phyſick, I had (the Year before) preſcribed her was all ſpent, her Speech, and the Uſe of her Legs left her firſt in *September,* on a *Tueſday* about Noon, and returned the *Saturday* following near the ſame Hour; and that from *Michaelmas* to the Time of our Diſcourſe (which was *July* 18, following) her Speech and Strength of Legs obſerved the ſame Period (of going off on *Tueſdays* every Week, and returned on *Saturdays*) with only two Exceptions, *viz.* That once they returned on a *Friday,* another Time not before *Sunday.* She added, That her Daughter was, the preceding Winter very weak, and in Danger of Death; that her Appetite was much abated; that ſhe ſometimes choſe to eat Bread, Water and Salt, boiled together; that now, as the Summer came on, ſhe recovered ſome Degree of Strength;

that ſhe had loſt no Senſe at any time, beſides that of Feeling; which was by the firſt Quantity of Medicines reſtored effectually, and without Relapſe. That the *Menſes* were regular as to Period, but as to Quantity unequal, and that when they were moſt ſhe was worſt. That before her Speech uſed to go off, ſhe conſtantly loſt, for an Hour's Space, the Uſe of her left Arm; that when her Speech was leaving her, ſhe would ſtammer out ſome few Words, and after this, on a ſudden, became mute; and that when not able to ſpeak, ſhe often moaned, and made a melancholy complaining Noiſe; that her Speech did uſe to return (as it went off) all on a ſudden, and at once. She always had, as her Speech ceaſed, and two Hours after it was gone, a Pain in her left Side, including Arm and Leg; her left Foot was then drawn up, as before-mentioned: Her Face was high-coloured when ſhe loſt her Speech, pale when it returned; no Part of her Body withered, but the whole generally cold. Some Time before ſhe was at firſt ſtruck Speechleſs her Hands uſed to tremble, but have been of late more ſteady; nor was ſhe now ſo dull and heavy as formerly; but for the generality, more briſk and chearful than in her State of Health. When ſhe has her Speech ſhe goes beſt; but is always forced to uſe a Stick, being never able to go ſteadily: She ſpeaks by Intervals as diſtinctly as ever, and as loud; can ſing, when capable of ſpeaking, but at no other Time.

I found, that the Mother ſometimes had *Convulſive* Fits; and though a poor labouring Woman, was extreamly *Hyſterical*. And I obſerved the Daughter to have a pale, ſickly Look, a heavy Eye, and a low Pulſe, and to be much waſted in Fleſh. She continued in my Neighbourhood about two Months, and I ſaw her almoſt every Day for the whole Time; I then repeated the former Courſe, furniſhing her with large Quantities of her old Medicines, and ſo diſmiſſed her, with Orders to let me hear again from her when the Phyſick ſhould be all ſpent: Accordingly, in *Sept.* 1688, ſhe came (with her Mother) from *Stow* to *Oxon* (that is almoſt 20 Miles) on Foot. I gave her a further Supply of Medicines, and by the 10th of *Nov.* following ſhe was grown ſtrong, and to all Appearance well as ever. For two Months, then laſt paſt, ſhe did go, and ſpake every Day, but not at all Times of the Week; for her Speech left her (as formerly) on *Tueſdays*, but (now) returned the next Day after Noon. Thus ſhe continued to the Summer following; not ſpeaking (in more than 20 Months) on any one *Wedneſday* Morning.

In the Summer, 1689, hoping to compleat the Cure, I procured for her a large Stock of Medicines for the Winter following; but from that Summer to this of 1698, I have heard nothing of her.

There was ſome of Opinion, that this young Woman counterfeited; but upon ſtrict Examination, I could never find any Reaſon for that Suſpicion; and I beg leave to ſay, I think it was not in her Power ſo to do.

An odd Convulſion in the Cheek; by Dr. Dawbeny Turberville. n. 164. p. 737.

IX. A Man came to me, who had a long Time been troubled with a great Pain and *Convulſions* in his Cheek; you might cover the Place where the Pain was, with a Penny; the *Convulſions* pulled his Mouth, Face, and Eye aſide.

ſide. I applied a Cupping-glaſs to the Place; then I ſcarified and cupped him again; after which I put on a Plaiſter of *Diapalma*, and he was perfectly cured.

A Periodical Convulſion; by Dr. Will. Cole. n. 174. p. 1113.

X. The Subject of the following Hiſtory was a lively, ſenſible Woman, handſome, of a good Habit of Body, 'and conſtantly employed in domeſtick Affairs, whereby ſhe enjoyed for many Years a perfect State of Health, though ſhe had bore ſeveral Children. About ten Years ago, towards the Middle of her Pregnancy, ſhe was taken with *Hyſtericks*, (I don't know from what Accident) which, though they yielded to proper Remedies at that Time, returned now and then afterwards, though not very frequently. At laſt, about the Time of her Lying-in, having fatigued herſelf too much, (which Neceſſity, it ſeems, obliged her to) the Day following ſhe was taken with Labour-pains, (which the Fatigue very probably brought ſooner upon her) attended with violent Flooding. But the Child did not appear yet, and ſhe was ſo much exhauſted with the Loſs of Blood that her Life was deſpaired of. At laſt recovering Life, as it were, (after being delivered of a dead Child) ſhe was ſoon after ſeized with convulſive Paroxyſms, which troubled her extreamly at Times, in ſpite of all that could be done for her, ſeveral Months. At laſt ſhe grew a little better, though the Symptoms did not quite diſappear. On the contrary, they were very ſoon afterwards exaſperated, and then they did not return irregularly as before, but at ſtated Periods; at firſt every third Day, if I remember right, then every fourth, and ſoon after every fifth Day, that is, reckoning four whole Days between the Paroxyſms. And they returned as punctually as the Clock ſtrikes the Hour. They began firſt with Yawning, a gentle Rigor, and a copious Diſcharge of limpid Urine. Preſently after the Convulſions came on, and the By-ſtanders were obliged to hold her Hands, to keep her from tearing her Cloaths and Face. She endeavoured all ſhe could to bite the Hands of thoſe who held her, for ſhe was quite Light-headed, and Speechleſs all the while. After ſhe had remained for an Hour or two in this convulſive State, ſhe had again a plentiful Diſcharge of limpid Urine, after which the Symptoms went gradually off, and ſhe fell into a Sleep which continued ſeveral Hours. As ſoon as ſhe waked, ſhe found her Senſes quite reſtored, but remembred nothing that paſſed during the Time of the Paroxyſm. On the intermediate Days, though ſhe was free from all the above Symptoms, yet ſhe was ſo weak and enervated, that ſhe could hardly get out of Bed, riſe from her Chair, or walk about the Room, without a Servant to ſupport her.

Being called in to viſit her, I began the Cure with Teſtaceous Medicines and the Spirit of Hartſhorn; taking the Indication from the profuſe Diſcharge of Urine, and the great Diſorder of the Nerves, which plainly diſcovered a remarkable Sharpneſs both in the Blood and the nervous Fluid. But the Paroxyſms continuing as violent as ever, notwithſtanding theſe Remedies, and returning at regular Periods as before, it came into my Head, that theſe convulſive Paroxyſms ought to be managed the ſame Way as thoſe of an Intermitting Fever. For although they were not attended with ſo much Heat as is uſual in common Intermitting Fevers, yet as they returned periodically in the ſame Manner as theſe Fevers do; and as all Intermitting Fevers, properly ſo called, don't excite the ſame Degree of Heat, yet they are all cured with the ſame Medicine, *viz.* the *Peruvian Bark*, I determined to try the Force of that famous Specifick againſt this Diſeaſe. In the mean Time, as I had a ſtrong Suſpicion of an acid Acrimony in the Fluids, I ordered the above-mentioned Medicines to be continued at proper Intervals. The Succeſs of this Method anſwered entirely to my Wiſh; for after taking two or three Doſes of the Bark before ſo many Paroxyſms, (which was my uſual Way of preſcribing it at that Time) the Symptoms began ſenſibly to become more mild, and at laſt by continuing the Uſe of it, intirely diſappeared; nor have they ever returned ſince, as far as I have heard.

A Periodical Diſeaſe of the Convulſive Kind; by Dr. Will. Cole. *n.*174.*p.*1115.

XI. *Dorothy Cook*, a Widow of ſixty, who keeps a Coffee-houſe at *Worceſter*, began to be troubled with an *Epilepſy*, without any ſenſible Cauſe, when ſhe was about thirty-ſix Years old, and three Days after ſhe was married. At firſt the Paroxyſms returned very frequently, but not at regular Periods, and they came upon her ſo ſuddenly, that when ſhe ſeemed to be every Way in perfect good Health, ſhe would fall down in a Moment, ſenſeleſs upon the Ground, and thus would remain for ſome Minutes, like a Perſon half dead, without any Convulſions, and by and by her Senſes would return to her again. After ſome Months, about the Change of the Moon and the Full Moon, the Paroxyſms would return ſeveral Times a Day, for two or three Days running, while at other Times ſhe had her Health very well. A few Months after that, the Paroxyſms, which before had returned only once a Fortnight, began to come upon her twice a Week, but at equal Diſtances, *viz.* on *Thurſdays* and *Saturdays*. Soon after ſhe was married, ſhe fell with Child, which ſhe bore at the full Time; but it ſoon died of the Epilepſy. The ſecond Child ſhe had, died of the ſame Diſeaſe. But though ſhe bore ſeveral Children afterwards, both Boys and Girls, there is not one of them, even to this Day, that ever has had the leaſt Symptom of that Diſorder.

The Paroxyſms returned in the Order above-mentioned, for about three Years, till by the Uſe of a celebrated Medicine given her by a certain Quack, they diſappeared for ſome Months. But upon Occaſion of a Fright, they returned upon her again, having rather, it would ſeem, been palliated for a Time than cured. She had recourſe again to the ſame Remedy, but without the leaſt Succeſs. However by the Aſſiſtance of Dr. *Johnſtone*, who practiſed many Years with great Reputation at *Worceſter*, and is but lately dead, ſhe got well a ſecond Time, and continued very well till the famous *Battle* of *Worceſter* in the Year 1651, when that Town was taken by *Cromwell*, and Death and Terror being ſpread all round, ſhe (like the reſt of the Inhabitants) was put into ſuch a Fright, that the Paroxyſms returned upon her, irregularly at firſt and very frequently, but afterwards they returned gradually to their former Periods. After this ſhe had a great many Remedies, both of Dr. *Johnſtone*'s preſcribing and others, but to no manner of Purpoſe. After they had returned in this manner for about two Years, at laſt upon a ſecond Fright, they changed their Time of coming, and firſt they came twice a Week, afterwards only once, *viz.* on a *Sunday* (ſhe happening to receive the Fright on that Day) and ſo have continued ever ſince. The Progreſs of the Periods and Symptoms for thoſe Years by-paſt have been as follows.

Every *Thurſday* towards the Evening, a Pain begins in the Crown of her Head, and at the ſame Time a kind of Throbbing about the *Os Sacrum*, which mounts up gradually *next Day* to the middle of her Back. On the *Saturday* it ſtill increaſes, attended with great Thirſt, and a few Hours after ſhe is gone to Bed, it riſes up to her Shoulders, becoming gradually more violent. As ſoon as it has got there, though before ſhe was able to go about her houſhold Affairs, ſhe dares hardly venture to move herſelf in the leaſt in Bed. And unleſs ſhe is extreamly cautious in avoiding all Motion, the Paroxyſm (which otherwiſe would not have ſeized her for ſome Hours) immediately comes upon her, and with much greater Violence than it would otherwiſe have done. That Night ſhe ſleeps little for the exceſſive Pain, which ſtill grows worſe, and chiefly her Head. Next Morning, the Pain abates, and ſhe falls into Slumbering, but very reſtleſs, which obliges her to lie in Bed all *Sunday*. She ſleeps a little, but frequently awakes, calls for ſomething to drink, and as ſoon as ſhe has taken it, compoſes herſelf to Reſt. About Twelve o'Clock, if ſhe does not awake of her own Accord, ſhe is called by ſomebody about her, and prevailed upon to eat ſomething, ſtill remaining ſenſible of every Thing that has paſſed about her. Immediately after this, ſhe falls again into a Sleep (unleſs you would rather chuſe to call it an Apoplectick Fit; for ſhe can neither be awaked now, nor does ſhe remember any Thing that paſſes at this Time) with frequent toſſing of her Body in Bed, and thus ſhe continues till Six a-Clock in the Evening, when ſhe is taken with Convulſions which come upon her in Fits for the Space of five Hours. They are gentle in the Beginning, but at laſt about eleven at Night they become very violent. Between the Paroxyſms ſhe drinks Ale greedily; for when ſhe is in her Senſes, ſhe forbids them to give any ſmaller Liquor to drink at thoſe Times, becauſe ſhe finds it hurt her Stomach. From this Hour her Senſes, which had been ſo long ſtupified, are perfectly reſtored to her; but ſhe paſſes the reſt of the Night very reſtleſs, and void of Sleep. On *Monday* about Nine in the Morning, not being able to lie in Bed any longer, ſhe gets up, but complains of Pain all over her Body, and though that Day ſhe walks about the Houſe pretty ſtoutly, and ſerves her Gueſts with Coffee herſelf, yet ſhe feels her Joints ſtiff and unfit for Motion, till refreſhed with next Night's Sleep, which is always very ſound. After this, ſhe has two or three Days Truce to recruit in, till the Diſeaſe having gathered a freſh *Fomes*, the ſame Symptoms are repeated, and in the ſame Time and Manner. But there is no actual Evacuation to be obſerved, neither by Sweat nor Urine, nor any other Way, which makes me imagine, that the Morbifick Matter ſent from the Brain is received into the Maſs of Blood, to be prepared into a new Ferment for renewing the Paroxyſms. For a great many Years bypaſt, ſhe has refuſed taking any kind of Medicine, being long ago tired out with taking Drugs to no Purpoſe. There is one Thing however very ſingular about her, which would make one ſuſpect her to be whimſical, if it was not very well known that, when the nervous Syſtem is affected, the Mind is apt to receive very odd Impreſſions. It is this: She has perſwaded herſelf of a long Time, that if ſhe was to go out of Doors, ſhe ſhould immediately be ſeized with a Paroxyſm, upon which account ſhe has kept conſtantly at home for ſome Time. About twenty Years ago, ſhe was prevailed upon by the Importunity of a Neighbour to go to ſup Abroad, and ſhe was no ſooner got into the Houſe, than ſhe was ſeized with a Paroxyſm, as ſhe had foretold, before the uſual Time of its coming, and more violent than ordinary, ſo that ſhe was obliged to be carried home immediately; after that ſhe never ventured Abroad, till about eighteen Years ago, that ſhe removed to another Houſe, and then (though ſhe was carried in a Chair) ſhe was preſently taken with a Paroxyſm before the Time, and it returned twice a Day for ten Days ſucceſſively, after which it came back at its uſual Periods. But what is moſt ſingular is, that ſhe dares venture to move one Foot, nay her whole Body over the Threſhold, and frequently does it, but then ſhe muſt always keep the Tip of one Great-toe within the Threſhold, and ſhe dares not, nor will not upon any Conſideration, move herſelf intirely even an Inch beyond it. When that famous *Toucher*, *Greatarack*, was at *Worceſter*, he was carried to him to try what Effect his Hand would have in ſo ſingular a Diſeaſe. But ſhe no ſooner heard that he was come with that Deſign, than, though ſhe had not yet ſeen him, ſhe was taken with a violent Paroxyſm, which did not leave her for ſeven Days. In the mean Time, though ſhe has ſuffered this Complaint for ſuch a Number of Years, yet her Senſes and animal Functions are no wiſe impaired. She is in a good Habit of Body, inclining rather to Fat, of a florid Complexion, and, conſidering her Age, manages her Houſhold Affairs with as great Addreſs, as if ſhe did not labour under any Diſeaſe, eſpecially of the Head.

Diſcoveries in the Optick Nerve.; by S. Malpighi. *n. 27. p. 491.*

XII. *S. Malpighi* having diſſected the Head of a *Xiphias*, or *Sword-Fiſh*, which hath a very big Eye, obſerved that the Middle of the Optick Nerve is nothing elſe but a large Membrane, folded according to its Length in many Doubles almoſt like a Fan, and inveſted by the *Dura Mater*. This Structure of the *Optick Nerve* is only to be found in the Eye of Fiſhes. For that of an Ox, Pig, and other ſuch Animals, is nothing but a Heap of many ſmall Fibres of the ſame Subſtance with the Brain, wrapped about with the *Dura Mater*, and accompanied with many little Veſſels with Blood. Hence it appears that there muſt be many Cavities in this *Nerve*; for as much as the ſmall Filaments, of which it is compoſed, cannot be ſo cloſely joined, that there ſhould not be ſome void Space betwixt them.

A Man who becomes blind after Sun-ſet; by Dr. Pet. Parham. *n. 159. p. 559.*

XIII. 1. I was lately in *Suffolk* where I met with a young Man, about 20 Years of Age, who all the Day hath a good Sight, and diſtinguiſheth Objects at all Diſtances as well as any Body, and with as much Vigour and Unweariedneſs; but when Twilight once comes he is quite blind, and ſees nothing at all; ſo that he cannot without great Difficulty direct himſelf abroad, or even at Home by the Lights of the Fire or Candle

I viewed the Youth both by Day and Night: But there is no Diſeaſe in the Organ that can be obſerved; no *Vertigo* or Diſtemper in the Head to interrupt, or any way intercept the Spirits in their Motions; but to all Appearance, the Fabrick of the Organ is very true and exactly well, and never diſturbed with Fluxes any way. I tried him with Spectacles for Variety of Sight, but they did him no Service either by the Lights of Fire or Candle. He tells me, That he was thus from the firſt Time he was able to take Notice of Things, and it came without Diſtempers; That this Cloudineſs comes gradually upon him like a Miſt, as Day-light declines; That he is always alike in all *Aſpects* of the *Moon*; he feels no Pain by Fire or Candle-light; he finds himſelf no worſe in Winter than Summer, and obſerves no Miſchief upon taking Cold; he ſweats much at Work, but finds no Difference as to his Sight in thoſe Days when he works hard or not.

2. The Caſe now mentioned (though indeed in a different Senſe from that of *Hippocrates*) is called by many Writers *Nyctalopia*, or *Nocturna Cæcitas*, and is accordingly deſcribed by them with the Remedies for it. *Cornelius Celſus* mentions it under the Title of *Imbecillitas Oculorum.*

A Solution of this extraordinary Caſe; by Dr. Will. Briggs. *n.* 166. *p.* 804.

3. Every Body knows, that in the Day-time a great many Vapours rarified by the Heat of the Sun, aſcend, which fall down again after Sun-ſet, being condenſed by the Cold, and therefore the Air eſpecially near the Earth, muſt be thicker. Perhaps the Humours of the Eyes of the young Man above-mentioned may be affected in ſuch a Manner, as in the Evening to become thicker and more turbid by thoſe Vapours; the ſame Way as Urine by being expoſed to Heat or Cold, becomes clear or turbid. So that while the Sun acts above the Horizon, the Vapours being diſſipated by the Force of his Heat, the Humours of the Eye become clear; but as ſoon as he gets below the Horizon (from the contrary Cauſe) the Humours are diſturbed, or grow turbid, and hence that Diſpoſition of the Eyes which is requiſite to diſtinct Viſion, is altered. For from that Thickneſs of the Humours, the Rays of Light are ſo refracted, as ſcarce to be able to reach the Retina, or if they do reach it, they act with too weak an Impulſe.

All the Phænomena above-mentioned agree very well with this Hypotheſis. For in the firſt Place, he has been ſubject to this Complaint always from his Infancy without any Defluxion, or any other ſenſible Diſeaſe of the Eyes; the Cauſe of which is that peculiar innate Diſpoſition of the Humours, which are affected in the ſame Manner as the Air near the Earth by the Vapours after Sun-ſet, as has been explained above. In the ſecond Place, this Blindneſs creeps gradually upon him, from the Vapours gradually deſcending after Sun-ſet. Thirdly, the Changes of the Moon ſeem to have no Effect upon them, becauſe the Riſing and Falling of the Vapours do not depend upon that Planet. Fourthly, I ſuſpect the numerous Humours (*viz.* the Cryſtalline and Vitreous) to be ſo viſcid, that (though the Watery Humour and Tunica Cornea became clear) they cannot be diſſipated. Fifthly, This Blindneſs remains the ſame both in Summer and Winter; and the Reaſon ſeems to be, that although the above-mentioned Vapours do not always deſcend in the ſame Quantity, yet they fall always in a ſufficient

Quantity to produce that Effect. In the ſame Manner as I have ſeen certain acid Waters in my Neighbourhood, put on a Purple Colour upon having the Leaves of Oak bruiſed and ſteeped in them, but upon making a ſtronger Infuſion the Colour was not heightened; ſo in the Evening there deſcends always enough of Vapours to produce that Blindneſs, and if the Quantity be increaſed it has no obſervable Effect.

Another Perſon is of Opinion, that as there is no Cloud or Dimneſs to be obſerved in the Eyes of the young Man, the Cauſe of this Phænomenon is probably owing to the Diſpoſition of the Optick Nerve, whoſe little Tubes, while they are filled with the Solar Rays, eaſily admit viſible Forms, as they are called; but being deprived of them, they grow flaccid, and unfit for Viſion.

A Duplicity of Viſion, and a Gutta Serena, *after great Pains in the Head, and convulſive Fits; by Dr.* Briggs. *n.* 159. *p.* 563.

XIV. One *Daniel Wright*, aged about 19 Years, and of a Sanguine and Plethorick Conſtitution, about the End of the Year 1683, was ſeized with a Dizzineſs and Pain in the upper Part of the Head, which he told me, he could impute to nothing but the exceſſive cold Weather, which then raged with us to Extremity. Hereupon, having the Misfortune to apply himſelf to an ignorant Pretender to Phyſick here, a Plaiſter for his Head was only ordered at that time without any Evacuations. The Patient upon this grows much worſe, the Pains of his Head more fixed and girding (I ſuppoſe from ſome Spaſms or conſtrictive Motions of the *Meninges)* to which ſucceeded Convulſive Fits (which were accompanied afterwards with a Tremor upon his Arms and Legs) and upon this, all Objects appeared Double to him, from the Fibres of the *Optick Nerves* being thus diſtorted from their wonted Paralleliſm. After he had been thus tormented about 3 Months, he was taken into St. *Thomas*'s *Hoſpital.* Upon his Admiſſion I examined his Caſe, and judged that the *Optick Nerves* were affected, and that it was gone ſo far that it would probably end in a *Gutta Serena.* However, we endeavoured by all the Ways we could to relieve him. Accordingly we ordered the *Cephalic Pills*, and an *Electuary* (which we uſe in the Hoſpital in *Epileptic Caſes)* which he received much Benefit by; he was alſo (by Intervals) bled in the *Jugulars*, and in the *Hæmorrhoids*, and by Leeches, which alſo gave him good Relief; his Head was ſhaved, Bliſters applied to his Neck, and a Seton made ſome time after, *&c.* we endeavouring by all manner of Revulſions to drive the Humour another Way, if it were poſſible. But it was too much fixed; ſo that about two Months after he had been under our Care, a *Gutta Serena* ſeized on his Right Eye, that he could not ſee at all on that Side; but then the Duplicity ceaſed, and he ſaw all Objects ſingle again as before.

Whilſt we were ſolicitous about preſerving the Left Eye, which was ſtill in Danger, a ſevere Fit ſeized him, ſoon after which he died. I miſſed the Opportunity of Opening the Body; but I was told, that in the upper Part of the Head, Neck and Shoulders, a great Blackneſs appeared, not long after he was dead, from the Settling of the Blood, I ſuppoſe, in thoſe Parts.

Several remarkable Caſes relating to the Eyes; by Dr. Dawbeny Turberville. *n.* 164. *p.* 736.

XV. 1. The Diſeaſe which I call *Burſa Oculi*, or the Pouch of the Eye, is a Bag without Matter in it (like an empty Purſe) on the White of the Eye, under the Upper-Lid; it hung flag about the Length of a Thumb-nail.

2. Another Perſon had no viſible Diſeaſe in his Eyes, but could not ſee at all unleſs he ſqueezed his Noſe with his Fingers, or ſaddled it with narrow Spectacles; and then he ſaw very well.

3. A Maid about 23 Years old, came to me from *Banbury*, who could ſee very well, but no Colour beſide Black and White. She had ſuch Scintillations by Night (with the Appearances of Bulls, Bears, *&c.*) as terrified her very much; ſhe could ſee to read ſometimes in the greateſt Darkneſs for almoſt a Quarter of an Hour.

ib. p. 737.

4. A Sadler's Daughter of *Burford* had an Impoſtume which broke in the Corner of one of her Eyes; out of it there came about 30 Stones as big as a Pearl, and ſplendid; after which ſhe had a *Fiſtula*, which I cured.

5. Here was one in *Saliſbury* who had a Piece of Iron, or Steel, ſtruck in the *Iris* of the Eye; the Perſon was in very great Pain, and came to me; I endeavoured to puſh the Iron out with a ſmall *Spatula*, but could not; I then applied a Load-ſtone to it, and immediately it jumped out.

ibid. p. 738.

6. I was conſulted by a Maid who had a Puſtle broke in her Eye, out of which there came fine ſmall Sand, like Chalk, for many Weeks together; made uſe of Purging, Fumigation, and ſome Topicks, by which ſhe recovered her Sight in a very great Meaſure.

n. 167. *p.* 830.

7. About 6 or 7 Years ago, I had one Mr. *Oyliff* in Cure of his Eye. It was as big as my Fiſt, black, fleſhy, and of bluiſh Bladders; this I judged to be a Cancer. After Purging and Bleeding, I cut out the Ball, and ulcerated Fleſh, by many Cuts, which were all inſenſible to him, till I came to the *Optick Nerve:* At the laſt Cut he complained, and bled a little; the Wound was healed in about a Fortnight.

8. A young Man, my Patient, had an Eye as big as an Hen's Egg, very fair, without Blemiſh, Rheum, or Redneſs; and his Sight was pretty tolerable; I judged theſe Symptoms to proceed from thin Humours fallen on the Eye, and extending its Coats: I cured this Diſtemper by applying drying Medicines to the Head and Eyes, and making an Iſſue in *Nucha*. *Appello Morbum* Oculum Bovinum, *ſive* Oculi Hydropem.

An eaſy Help to a decayed Sight; by— n. 37. *p.* 727.

XVI. When I was not above 60 Years of Age, my Sight was ſo much decayed, that I ſeemed always to have a kind of thick Smoak or Miſt about me, and ſome little black Balls to dance in the Air before my Eyes; I could not diſtinguiſh the Faces of my Acquaintance, nor Men from Women, nor keep the plain trodden Paths, except I was led. I received no Benefit by any Glaſſes, but was in the Caſe of thoſe whoſe Decay by Age was greater than can be helped by Spectacles. The faireſt Prints ſeemed through Spectacles like blind Prints, little Black remaining. But I found great Help by the following Expedient: I took Spectacles that had the largeſt Circles; cloſe to the Semi-circles, on the over-part, on both Sides, I cut the Bone; then, taking out the Glaſſes, I put black *Spaniſh* Leather taper-wiſe into the emptied Circles, which widened enough (together with the encreaſing Wideneſs of the Leather) took in my whole Eye at the wider End; and preſently through the ſmaller End I could read the ſmalleſt Prints that are, as if they had been a large and fair Character. I made theſe empty Tubes of different Lengths, and the ſmaller Ends of different Bigneſſes: I can only put the very End of my little Finger into the Orifice of the leſſer, but the ſame Finger ſomewhat deeper, yet not quite up to the firſt Joint, I can inſert into the Orifice of the wider.

The Tubes may be of Paper only coloured black, and paſted on, and with the inner Folds, to be drawn out from one Inch to three; ſome of the Folds to be taken out, that the Orifice may be wider or narrower, as beſt fits to every Degree of Defect.

Probably, theſe Tubes may be proper for ſome that are Squint-eyed, whoſe Eyes do interfere; but certainly it will eaſe them that cannot well bear the Light, and perchance they will preſerve the Sight for longer Durance.

After I had uſed theſe Tubes little more than a Week, I could uſe them without much Trouble all the Day long; and my Sight was ſo much amended, that I could ſee the Greenneſs of the Garden, and Paſtures in a florid Verdure; whereas before the Uſe of them, all dark Colours had the ſame Hue to my Eye.

n. 39. *p.* 765. I have ſometimes put Convex-Glaſſes (for a Trial) into my Tubes; but I found the Prints, though ſomething larger, yet not ſo clear, ſo diſtinct, nor ſo pleaſing to the Eye, as when I uſed the empty Tapers. I find myſelf beſt at Eaſe with thoſe Leathern Tubes that are made without any faſtening to the Bone of the Spectacles; for as they hang in that ſlight Manner, I can with a Touch of my Finger raiſe them up, or bow them down, divide or unite them, to take in the ſame Object.

n. 40. *p.* 802. I found at firſt a great Diſcouragement in the Difficulty of uſing them, ſo that I could not endure the Trouble above 2 Hours at a Time: But by the Practice of a Week or a Fortnight, I found them an Eaſe and Pleaſure to me, for 12 at leaſt of each 24 Hours. And by all the Trials which I have yet made upon others, whether *Pore-blind*, or of faint Sight decayed by Age, or however weakned, it proves a very great Aid. For the *Pore-blind* they muſt be made ſhorter: For the decayed by Age they may be longer.

An Experiment concerning Deafneſs; by Dr. W. Holder, *n.* 36. *p.* 665.

XVII. A young Gentleman, who was born *deaf*, and continued dumb till his Age of 10 or 11 Years, was committed to my Care. His Mother, when ſhe was great with him, received a ſudden Fright; by Occaſion whereof the Child's Head and Face were a little diſtorted, the whole right Side (as I remember) being ſomewhat elevated, and the left depreſſed; ſo that the Paſſage of his Left-Ear was quite ſhut up, and that of the Right-Ear proportionally diſtended, and too open. I found, upon Examination, that the *Auditory Nerve* of this Right-Ear was not periſhed; and I ſuppoſed the Defect to lie in the Want of due Tenſion of the *Tympanum* of his Ear; whoſe Uſe I took to preſerve the *Auditory Nerve*, and Brain, and inward

Parts of the Ear, from outward Injury by Cold, Duſt, *&c.* For it is requiſite that the *Tympanum* be tenſe, and hard ſtretched; otherwiſe the Laxneſs of that Membrane will certainly dead and damp the Sound. The Tenſion of this Part is the principal Office of the three *Oſſicles*, *viz.* the *Malleus*, *Incus*, and *Stapes*; whereof the *Stapes* is fixed to the inner Bone, and Part of the *Malleus* to the *Tympanum*, and the *Incus* between them joined on one Part to the *Malleus*, and on the other to the *Stapes* by *Ginglymoide* Joints; and by the Help of a Muſcle drawing the *Incus*, theſe three Bones are brought to a curved or arched Poſture, and the *Stapes* being fixed unmoveable, the *Malleus* yields, to bring the Terms of that Line nearer, in Proportion as it is curved, and draws the Center of the *Tympanum*, ſtretching the Suface of it from a plain to a conoide Figure, within the ſame Circumference. And I conceive the Action of this Muſcle does ordinarily and conſtantly draw the *Tympanum* to a moderate Tenſion; but when we have Occaſion to liſten, and give a more particular Attention to ſome Sound, the Action of that Muſcle is then more intenſe, and the *Tympanum* is drawn to a more than ordinary Tenſion, ſo to facilitate the Paſſage of the Sound.

Upon theſe Conſiderations I adviſed his Mother to conſult with Phyſicians, if by ſome aſtringent Fumes or otherwiſe it might be reſtored to a due Tenſion. In the mean Time I thought of a temporary Way by the Impulſe of any vehement Sound; as of a Drum beating near him; which Sound, during its Continuance, muſt needs give the *Tympanum* a Tenſion, by driving and ſwelling it inwards, as a freſh Gale of Wind fills the Sails of a Ship; and the Experiment ſucceeded according to my Expectation. For ſo long as I beat a Drum faſt and loud by him, he could hear thoſe that ſtood behind him, calling him gently by his Name (which he underſtood, having learned to ſpeak and pronounce it among other Words) and when the Drum ceaſed, he did not hear the ſame Perſons, when they again very loud called him by his Name. And this we tried ſeveral Times, by beating the Drum again, and ceaſing it; and he ſtill heard them when the Drum beat, and heard them not when it ſtopped.

Having mentioned this Experiment to a Gentleman about *Oxfordſhire* in a great Degree of Deafneſs, he called to Mind, that he never heard ſo well and eaſily, as when he was diſcourſing with Company in a Coach, whilſt it went faſt, and made a great rumbling Noiſe in *London* Streets; by which he was induced to believe, that the Impediment of his Hearing was of the like Nature with the other.

The Organ of Hearing; by Dr. Raymund Vieuſſens, *n.* 258. *p.* 370.

XVIII. In the internal Structure of the *Organ of Hearing*, I obſerved firſt, a very fine thin Membrane within the Cavity of the *Tympanum*, which from its Situation I call the internal Membrane of the *Tympanum*, to diſtinguiſh it from that which blocks up the Extremity of the *Meatus Auditorius*, and which therefore I call the external Membrane of the *Tympanum*. The internal Membrane, when conſidered attentively, appears in each Ear furniſhed with an infinite Number of fine capillary Veſſels, which are ſent to it from the *Carotide Artery* and the *Jugular Vein* of each Side. Hence it is that, when theſe Veſſels are much diſtended with Blood, this Membrane appears almoſt quite red, eſpecially if you view it in the Sun with the Help of a Microſcope. Theſe Veſſels hinder the Membranes which line the lateral and upper Parts of the Cavity, from falling in with one another, and ſo being complicated together, which they certainly would do if they were not thus ſuſpended; ſeeing of themſelves they don't immediately adhere to the internal Surface of this Cavity.

This ſame Membrane, which is a Production of that which lines the *Aqueduct* internally, ſhuts up the Orifice which leads to the Cavities in the Mamillary Proceſs of the temporal Bone, and hinders the Air contained in theſe Cavities from communicating, at leaſt freely, with the Air in the *Tympanum.* Beſides one very thin Production of it ſhuts up that Orifice to which the *Stapes* is connected, and another ſhuts up that called the *Foramen Rotundum,* and is extended further all over the internal Surface of that ſmall Cavity which leads from the *Foramen Rotundum* to the Extremity of the *Semi oval Duct* of the *Spiral Cochlea,* and even to the little *Fiſſure* or *Chink* at the Baſis of the *Concha.* So that the internal Membrane of the *Tympanum,* by this intermediate Production, whereby it ſhuts up externally the Extremity of the *Semi oval Duct* of the *Spiral Cochlea,* and the *Chink* in the Baſis of the *Concha,* communicates with that Portion of the nervous Membrane which lines the *Parietes* of the *Concha* internally, and ſhuts up the *Chink* in the Baſis of the *Concha* within, and with the Extremity of the *Spiral* nervous *Lamella* which is contained within the *Semi oval Duct* of the *Spiral Cochlea.* Beſides, this ſame Membrane, below that Part which reſpects the internal Membrane of the *Tympanum,* leaves a remarkable Cavity, which admits the Air from without brought to it by the *Aqueduct,* and here it is ſo conſtructed, as to form three Cavities. The firſt is that which includes the internal *Apophyſe* of the *Incus,* and leads to the *Cells* in the *Mamillary Proceſs,* as I ſaid before. The ſecond, which lies in the Middle between the other two, and is the leaſt of the three, is ſituated preciſely below the Baſis of the *Concha,* and receives into it the Head of the *Malleus,* and almoſt all the Body of the *Incus.* The third is the largeſt of all, placed towards the internal Orifice of the *Aqueduct,* and contains in it a Part of the Belly of the firſt Muſcle of the internal Ear, a Portion of the *Incus* with its two *Apophyſes,* the *Stapes,* *Os Lenticulare,* the Tendon of the ſecond Muſcle of the internal Ear, and the Neck together with the Handle of the *Malleus.*

At laſt, this ſame Membrane, though not in every Subject, ſends off a very fine *Lamella,* which divides the third Cavity into two, like a kind of Partition. This *Lamella,* which has never yet been deſcribed by any Anatomiſt, as far as I know, is for the moſt part wanting, and, when it is found, it is connected above to the Baſis of the *Concha,* and below to the internal Membrane of the *Tympanum,* and ſeems to divide it into two equal Parts even to the Extremity of the Handle of the *Malleus,* and a little farther. So that this *Lamella,* together with the Extremity of the Handle of the *Malleus,* draws the Middle Part of the *Membrana Tympani* inwards towards the

Cavity, and inclines it in ſuch a Manner, as to render it a little concave towards the *Meatus Auditorius*, and a little convex towards the Cavity of the *Tympanum*. This *Lamella*, when it is found, will ſerve to hinder the external *Membrana Tympani* from being too much ſtretched, when the *Monogaſtrick Muſcle* of the internal Ear is violently contracted, or from being tore by the Extremity of the Handle of the *Malleus*, when that Muſcle is convulſed, or ſpaſmodically affected. So that it ſeems to ſupply the Place, as it were, of an Antagoniſt Muſcle to the above-mentioned *Monogaſtrick*, if you conſider it as acting with a long ſlender Tendon, as will by and by appear.

If any one chuſes to ſatisfy his Curioſity with a beautiful View of thoſe Parts, let him ſeparate the *Os Petroſum* from the reſt of the Skull of a Perſon that has been ſtrangled, or dead of a *Phrenſy* or *Apoplexy*, if he can come at ſuch a one. This Bone, after it is ſeparated from the reſt, muſt be kept in a dry Place for two Days, that the *Membrane* which I am now deſcribing may be gently dried, and by this Means ſo contracted, as to ſeparate ſufficiently from the internal Surface of the Cavity in which it is contained, ſo that it may not be lacerated by the Hand of the Anatomiſt who is to examine its Texture. Afterwards, the thin Bone which conſtitutes the upper Part of the *Tympanum*, is to be cut away by little and little, as dextrouſly as poſſible with the Help of a Knife. As ſoon as the upper Part of the *Tympanum* is removed, the *Membrane* I now ſpeak of, which before lay concealed within the Cavity of the *Tympanum*, becomes conſpicuous to the Sight, and being extreamly vaſcular, and, all its Veſſels diſtended with Blood, it repreſents a Kind of *Rete Mirabile*.

This *Membrane* has various ſurpriſing Uſes, which are next to be deſcribed. In the firſt Place, by its thin Production which covers the *Entry* into the *Labyrinth*, it hinders that innate pure ſubtile Air which is confined within the Cavities and Meanders of the *Labyrinth*, from communicating, at leaſt freely, with the groſs Air derived to the *Tympanum* by the Cavity of the *Aqueduct*: Secondly, the Membrane, by the mild Heat of the Blood in its Veſſels, gently warms the bony Baſis of the whole *Labyrinth*, and at the ſame Time enlivens and preſerves the Motion of the Air contained in the two *Veſtibula*, through their Windings, and of that pure Lymph impregnated with animal Spirits which moiſtens all the Fibres of the *ſoft Portion*, as it is called, of the *Auditory Nerve*, to be deſcribed below. Thirdly, this ſame *Membrane* contains within its Cavities an Air very much rarified by the gentle Heat of the Blood moving through its Veſſels, and being thus rarified, and conſequently very ſubtile, and impregnated with a great Quantity of *Æther*, it is rendered very fit for receiving eaſily the Impreſſions of all ſonorous Bodies, and tranſmitting them quickly to the Air, and to all the Productions of the ſoft Portion of the *Auditory Nerve* within the *Labyrinth*, as alſo the *Centrum Ovale* of the Brain.

From what has been already ſaid, it plainly follows, that the *Membrane* which we are now upon, conduces ſurpriſingly to *Hearing*. For being of a very fine delicate Texture, it allows a free Ingreſs and Egreſs to the Impreſſions of ſonorous Objects to and from its Cavities, which Impreſſions, being firſt communicated to the Air ſurrounding the Head, are tranſmitted to this Membrane by the Motion of the *Æther*, with which the Air is impregnated, and by innumerable inſenſible *Foramina* in the external *Membrane* of the *Tympanum*, as alſo by Means of the *Aqueduct*. And indeed, if I am not miſtaken, the Impreſſions of ſonorous Objects, communicated to the Air within the Cavities of this *Membrane*, or to that which ſurrounds it externally, being ſtrongly impregnated with *Æther*, are tranſmitted in a Moment through the *Labyrinth* by its proper Orifices, and from thence, by the Intervention of the animal Spirits there, inſtantaneouſly communicated to the *Centrum Ovale* of the Brain. And there according to the different Impreſſions of ſonorous Objects, different *Ideas* are produced in the *Soul*, which determine the different Species of Sound, which again are expreſſed by different Names. The Truth of what I have now advanced is confirmed by Experience. For whenever this *Membrane* is corroded or deſtroyed, by *Pus* formed either within the *Mamillary Apophyſe*, or the Cavity of the *Tympanum*, the Hearing is thereby either rendered very dull, or entirely loſt.

From what has been ſaid may clearly be underſtood, how a tumultuous Motion, producing a preternatural Sound, muſt neceſſarily be occaſioned in the *Tympanum*, when either from immediate Eating or Drinking, Obſtructions of the lower Belly, tedious and fatiguing Exerciſes of the Mind, or from any other Cauſe, there is too great a Quantity of too rarified Blood ſent to the Veſſels of the above *Membrane*. For that Blood by its too great Quantity and too great Rarefaction, dilates and pulſates too much in the ſmall Arteries, and by this Dilatation and Pulſation, together with the Motion of the Vapours which exhale from the Blood here, this *Membrane* is ſhaken in ſuch a Manner, as to produce a confuſed Kind of Noiſe in the Cavity of the *Tympanum*: Eſpecially if thoſe Vapours cannot eaſily tranſpire, either upon Account of an Obſtruction in the *Aqueduct*, or of too compact a Texture of the external *Membrane* of the *Tympanum*, being tranſmitted to the *Centrum Ovale* of the Brain, produces that *Idea* of *Sound* in the Mind which is commonly called a *Murmur*. Of this *Murmur* there are three Species, which are known to every Body, but hitherto diſtinctly explained by none as far as I know. They are theſe, *Humming*, *Hiſſing*, and *Tinkling*. When this Vapour which raiſes a *Murmur* in the Ear, is ſo moiſt as to approach pretty near to the Nature of Water, it relaxes the inner *Membrane* of the *Tympanum* which is very moveable, at the ſame Time moving and bending it different Ways. By this Means the Air contained within the Cavity of this *Membrane*, is agitated ſo, as to receive gentle, ſucceſſive, undulating Vibrations, the ſame as it receives from Water flowing into Waves, after falling from ſome Eminence, or from a Swarm of Bees moving all at once in various Directions. Theſe *Vibrations*, by Means of the animal Spirits in the *Medullary Portion* of the *Auditory Nerve*, are communicated to the *Centrum Ovale* of the Brain, and raiſe the *Idea* of that dull confuſed Noiſe which we commonly call *Humming* or *Buzzing*. When this Vapour is ſo devoid of watery Particles, as to approach more to the Nature of a dry Exhalation, and is therefore flatulent, then by acting upon this *Membrane*, it will in ſome Meaſure dry, diſtend and expand it. This *Membrane* then being thus dried, diſtended, and expanded, by a Motion communicated to it, will ſo ſhake the ſurrounding Air, as well as that within the Cavities of the *Membrane*, as to excite ſtrong *Vibrations*, ſucceſſive indeed, but quick, and following one another almoſt in ſtreight Lines. So that the *Vibrations* will be near the ſame, as if this *Membrane* was ſtrongly ſhaken with meer Air, and being tranſmitted to the *Centrum Ovale* in the Manner above deſcribed, will excite the *Idea* of a confuſed *Acute Sound*, which is called a *Hiſſing* or *Singing* in the Ear. Laſtly, if the ſame internal *Membrane* of the *Tympanum*, or only a Part of it, is ſhaken by the ſtrong and frequent Pulſation of the Blood, in ſome Meaſure obſtructed in its ſmall Arteries, then (if at the ſame Time it is ſo diſtended with a dry warm Vapour, as ſtrongly to reflect the *Vibrations* communicated to it) it will ſo agitate both the ſurrounding and contained Air as to give it the ſame Kind of *Vibrations*, as thoſe occaſioned by quick, repeated Strokes of a Silver Hammer upon a ſmall Anvil either of Silver or any other ſonorous Metals. Whence it is no Wonder, that thoſe *Vibrations*, when they get to the *Centrum Ovale* of the Brain, excite that *Idea* of Sound which we call a *Tinkling* in the Ear.

I have likewiſe ſeveral Years ago frequently examined the *Muſcles* of the internal Ear, and have always obſerved it provided with only two Pair. Theſe Muſcles are provided with Nerves from the Fifth Pair, by almoſt inſenſible Twigs, and with extream ſmall Blood Veſſels, from the internal *Carotide Artery* and *Jugalar Vein.* The firſt of them, which is thicker and longer than the other, has two Heads and two Tendons, but only one Belly, and therefore I call it the *Monogaſtrick Muſcle.* The firſt Head, which is covered with a Membranous Sheath, ariſes from a ſmall bony *Sinus*, dug out above the upper Part of the *Aqueduct*; and the ſecond, which appears intirely fleſhy, takes its Origin not far from the external Side of the ſmall bony *Sinus* juſt now mentioned. The fleſhy Fibres which compoſe the two Heads of the Muſcle, I am now ſpeaking of, are united firmly together, a little before they enter the Cavity of the *Tympanum*, and then end in one common Belly every where incloſed in a ſtrong membranous Sheath. Further, theſe ſame fleſhy Fibres, ſoon after they have got into the Cavity of the *Tympanum*, ſeparate from one another, and end in two Tendons, which are likewiſe incloſed in a ſtrong membranous Sheath. The firſt of thoſe Tendons, which is longer and ſlenderer than the other, after running a little upwards, is faſtened, by the Means of a ſmall membranous Pulley, to that Part of the *Os Petroſum*, to which is inſerted the Beginning of the *Aqueduct* of *Fallopius*, or the ſmall bony Canal which admits the *Portio dura* of the *Auditory Nerve*; and by this membranous Pulley all its Motions are rendered free. After this the Tendon, turning perpendicularly downwards over the ſlender *Apophyſe* of the *Malleus*, is connected to this *Apophyſe*, expanding itſelf at its Inſertion, whereby its Connexion is continued as far as the Neck of the *Malleus*. The ſecond Tendon of the Muſcle which I now deſcribe, is ſhorter and thicker than the firſt, and ſtrongly incloſed in the membranous Sheath. It runs almoſt in a ſtreight Courſe to the Cavity of the *Tympanum*, and is connected to the Middle of the Head of the *Malleus*, where it expands itſelf ſo as its Inſertion is continued as far as the Body of the *Incus*, and therefore it helps to connect theſe two Bones together. This Tendon is connected to the ſubjacent Bone, by the Means of the above-mentioned Membranous Sheath. The ſecond Muſcle of the internal Ear riſes from a ſmall bony Canal in the lower Part of the *Os Petroſum*, between the Entry into the *Labyrinth* and its *Feneſtra*. This Muſcle is much ſmaller and ſhorter, than the one above deſcribed, *viz.* the *Monogaſtrick*; and hence I call it the *leſſer Muſcle* of the internal Ear. Its fleſhy Belly is pretty large, and it is inſerted by a very ſlender Tendon into the Head of the *Stapes*.

When the *Monogaſtrick Muſcle* of the Ear is contracted, its longer Tendon pulls the Head of the *Malleus* and the Body of the *Incus* a little upwards. I ſay, it only pulls it a little upwards, becauſe the ſhort Tendon of the ſame Muſcle being connected to the Extremity of the Head of the *Malleus*, as the longer one is connected to its ſlender *Apophyſe*, and to its Neck, it will when contracted, reſiſt the Action of the longer one. For, as I obſerved before, this ſhort Tendon is connected to the ſubjacent Bone by means of its ſtrong membranous Sheath, and therefore it cannot be pulled much upwards; but conſequently, it muſt reſiſt in ſome Meaſure the Action of the longer Head when contracted, and ſo hinder it from pulling the Head of the *Malleus* together with the *Incus* much upwards. But when the Head of the *Malleus* is pulled up, the Extremity of its Handle muſt neceſſarily incline downwards, and therefore will puſh outwards the middle Part of the external *Membrana Tympani*, to which it is connected by Means of the contiguous internal Membrane, and therefore will ſtretch it, and render its Surface almoſt plain. While theſe Offices are performed by the Action of the *Monogaſtrick Muſcle*, and the *Malleus*, the fine Membrane above deſcribed, which we ſaid, ſeems to divide into two equal Parts the *Membrana Tympani*, muſt at the ſame Time be diſtended, when it is not wanting. So that this fine Membrane ſeems in ſome Meaſure to ſupply the Place of an Antagoniſt to the *Monogaſtrick Muſcle* of the Ear; becauſe by its Elaſticity it recovers its natural Tone, and by the ſame Effort which it makes to recover itſelf, it helps to reſtore the external Membrane of the *Tympanum* to its former Tone and Figure, as ſoon as it ceaſes to be preſſed by the Extremity of the Handle of the *Malleus*. But as by pulling up the Head of the *Malleus*, the Extremity of its Handle is inclined a little downwards, ſo by raiſing up the Head of the *Incus*, the Extremity of its internal *Apophyſe* is gently inclined downwards. I ſay, that by raiſing the Body of the *Incus*, the Extremity of its internal *Apophyſe* is only gently inclined, becauſe the *Incus* is ſo ſituated in a ſmall Cavity, dug out in the Bone which forms the internal Margin of the Baſis of the Cavity of the *Tympanum*, that its Body cannot be raiſed, but the Extremity of its external *Apophyſe* muſt reſt upon the ſubjacent Bone; to which it is almoſt contiguous. Hence it happens, that the *Monogaſtrick Muſcle* of the Ear by its longeſt Tendons, can raiſe the Body of the *Incus* but very little upwards. From what has been ſaid it clearly appears, that, upon account of two, for the moſt Part, and ſometimes of three Mechanical Cauſes, the *Monogaſtrick Muſcle* of the Ear by its longer Tendon, can raiſe the *Incus* and the Head of the *Malleus* only a little upwards, and therefore can only incline the internal *Apophyſe* of the *Incus* and the Extremity of the Handle of the *Malleus* a very little downwards.

When the Body of the *Incus* is raiſed a little up, its internal *Apophyſe* is inclined gently downwards, as has juſt now been ſaid, and at the ſame Time draws along with it the Head of the *Stapes*, connected to it by the intervening *Lenticular Bone*, and therefore depreſſes it a little likewiſe. But while the Head of the *Stapes* is inclined a little downwards, the upper Part of its Baſis muſt neceſſarily be removed a little from the upper Part of the *Feneſtra*, or the Orifice of the *Labyrinth* upon which it ſtands, and therefore it muſt open it a little, and in a Manner pulſate it, if I may be allowed the Expreſſion. From what I have juſt now ſaid, it may be eaſily underſtood, how the long Tendon of the *Monogaſtrick Muſcle* of the Ear conduces two Ways to make the Senſe of Hearing more eaſy and diſtinct. For, Firſt, as by Means of the Extremity of the Handle of the *Malleus*, it ſtretches the internal Membrane of the *Tympanum*, and renders its Surface almoſt plain in the Manner above deſcribed, it thereby dilates the Pores of this Membrane, whence the *Æther* which approaches it, laden with ſonorous Impreſſions eaſily enters the Cavity of the *Tympanum*; as ſoon as it has got there, it communicates theſe Impreſſions to the Air contained in that Cavity, whence they are tranſmitted into the *Labyrinth* by its proper Orifices, and no ſooner they arrive there, than they are mixed with the animal Spirits in the Fibrils of the *Portio Mollis* of the *Auditory Nerve*, which are likewiſe replete with *Æther*, and theſe animal Spirits tranſmit them pure to the *Centrum Ovale* of the Brain, where they excite that *Idea* in the Mind which *God* has ordained them. Secondly, the long Tendon of the *Monogaſtrick Muſcle* of the Ear helps to render Hearing more eaſy and perfect, by gently opening the upper Part of the *Feneſtra* of the *Labyrinth* in the Manner above explained; becauſe at this Time one Portion of the *Æther*, full of ſonorous Impreſſions, more eaſily enters the ſecond Orifice into the *Labyrinth*, whilſt another Portion of it enters the firſt.

When the ſame *Monogaſtrick Muſcle* of the Ear is contracted, it pulls a little obliquely towards itſelf by its ſhorter Tendon, the Head of the *Malleus* together with the *Incus*. And hence the Extremity of the Handle of the *Malleus*, and the Tip of the internal *Apophyſe* of the *Incus* are inclined outwards towards the Membrane of the *Tympanum*. But the Extremity of the Handle of the *Malleus* being thus inclined outwards towards the *Meatus Auditorius*, it neceſſraily depreſſes the convex Part of the external *Membrana Tympani* to which it is connected, and therefore greatly conduces to increaſe its natural Tenſion, as alſo to make plain both its Surfaces. Again, when the ſharp Point of the internal *Apophyſe* of the *Incus* is inclined outwards towards the *Membrana Tympani*, as was juſt now ſaid, it muſt neceſſarily pull along with it the Head of the *Stapes* by Means of the *Lenticular Bone* which is connected to it, and therefore it will remove a little the internal lateral Part of the Baſis of this ſmall Bone from the internal lateral Part of the

Feneſtra of the *Labyrinth*. By this Means there will be a Chink made between the internal lateral Margin of the Baſis of the *Stapes*, and the internal lateral Margin of the *Feneſtra* of the *Labyrinth*, which will afford a Paſſage, though very narrow, into the *Concha*, to the *Æther* impregnated with ſonorous Impreſſions, going to enter the *Labyrinth*. From what has been now ſaid, it plainly appears, that the two Tendons of the *Monogaſtrick Muſcle* of the Ear ſerve the ſame Purpoſes, though their Motions, as acting upon different Parts, are different, nay, even contrary to one another. And indeed each of them tends in a Manner peculiar to itſelf to ſtretch and make plain the external Membrane of the *Tympanum*, and therefore renders eaſier the Paſſage for the *Æther* full of ſonorous Impreſſions into the Cavity of the *Tympanum*; for while the longer Tendon opens a little the upper Part of the *Feneſtra* of the *Labyrinth*, the ſhorter one opens the lateral internal Part of the ſame *Feneſtra*, whereby a Chink being there made, a certain Portion of that *Æther* is allowed to enter the *Concha*.

The *leſſer Muſcle* of the internal Ear, if you conſider its Origin and Inſertion, cannot be contracted, but it muſt pull the Head of the *Stapes*, to which it is inſerted, from without inwards, and therefore muſt open a little the external lateral Part of the *Feneſtra* of the *Labyrinth*, and ſo allow a Paſſage for the *Æther* into the *Concha*. From hence it clearly appears, that the *leſſer Muſcle* of the Ear, of which we are now ſpeaking, by its Contraction opens the *Feneſtra* of the *Labyrinth*, juſt in an oppoſite Manner to that of the ſhort Tendon of the *Monogaſtrick Muſcle*. Hence, doubtleſs, it muſt happen that, upon Account of the oppoſite Motions of theſe two Muſcles, juſt now explained, the *Feneſtra* of the *Labyrinth* can never be much opened, and can only be opened on its external Side by the leſſer Muſcle acting, and on its upper and internal Side by the *Monogaſtrick Muſcle*, as has been already clearly and fully explained.

There is no Body can doubt, that the Parts above deſcribed, with which the Cavity of the *Tympanum* is furniſhed, naturally ſerve the different Offices which I have aſſigned them, becauſe whenever their natural Functions are diſturbed, the Hearing ſuffers. But at the ſame Time I would not have any Body to think, that theſe Parts are abſolutely neceſſary to Hearing. For I have frequently, in human Subjects which I have diſſected, obſerved both the external and internal *Membrane* of the *Tympanum* to be wanting, and even the greateſt Portion of the *Muſcles* above deſcribed, theſe Parts being almoſt intirely conſumed by the acrid Pus of Abſceſſes, produced ſometimes in the *Cells* of the *Mamillary Apophyſe*, and ſometimes in the Cavity of the *Tympanum* itſelf; and yet in all thoſe People, who had a purulent *Abſceſs* either in the one Ear or the other, the Hearing was not quite loſt in the Ear affected, as I was told by themſelves while they were alive.

I come next now to conſider, whether the two Muſcles of the internal Ear act voluntarily or not. And after conſidering the Affair as attentively as poſſible, I cannot help being of Opinion, that, as the Motion of theſe Muſcles is determined partly by the Will, and partly by the Impreſſions of ſonorous Objects without the Conſciouſneſs, nay, ſometimes even contrary to the Conſent of the Will, their Action muſt be partly voluntary, and partly involuntary. And indeed it is very likely, that the ſame Action of the Will which determines us to hear a Thing eaſily and diſtinctly, at the ſame Time determines the animal Spirits to flow towards and promote the Action of thoſe Muſcles, which aſſiſt us in preceiving Sounds quickly and diſtinctly. But at the ſame Time the Motion of theſe Muſcles can never be called intirely voluntary, becauſe every Body muſt be perſwaded from his own Experience, that they frequently act without the Conſent of the Will, as I have juſt now ſaid. And as this is the Caſe, there can be no other extrinſick Cauſe to determine thoſe Muſcles of the internal Ear to act, than the *Æther* filled with the Impreſſions of ſonorous Objects; and the Manner in which theſe Cauſes act upon thoſe Muſcles, ſeems to me to be thus. When the *Æther* by its repeated *Vibrations*, which are ſometimes quicker and ſometimes ſlower, approaches the external Membrane of the *Tympanum*, it is almoſt all determined towards its concave Part, and then both by its Approach and by penetrating the Pores of the Membrane, it ſhakes it, and at the ſame Time protrudes it inwards. But the common Part of the *Membrane* of the *Tympanum* being thus ſhaken and protruded inwards, it puſhes the Extremity of the Handle of the *Malleus* which is connected to it from the *Meatus Auditorius* to the Cavity of the *Tympanum*, raiſes it up, and at the ſame Time makes the *Head* of the *Malleus*, and the *Incus* which is joined to it, incline downwards. The *Head* of the *Malleus* and the *Incus* being thus inclined downwards, they pull towards them the two Tendons of the *Monogaſtrick Muſcle* of the internal Ear, ſtretch this whole Muſcle, and by this Means make it acquire that elaſtick Force which is requiſite for its Contraction. But as the Vibrations of the Air impregnated with *Æther*, however quickly they ſucceed one another, are always plainly diſtinguiſhed from one another by intermediate Spaces of Time intervening, it appears very certain to me that, in that intermediate Space of Time which intervenes between the firſt and ſecond Vibration, for Example, the above ſaid Muſcle, by that elaſtick Force which it acquired by being ſtretched, and by its own gentle Diſtenſion, is determined to contract itſelf, and ſollicit towards it the animal Spirits, and that it really does contract, by the Aſſiſtance of theſe Spirits, which have juſt entered the Pores of its Muſcular Fibres. The *Monogaſtrick Muſcle* of the Ear being contracted, puſhes the *Stapes* from the inner Cavity of the *Tympanum* inwards, and ſo ſtretches the leſſer Muſcle of the internal Ear, and diſpoſes it to acquire an elaſtick Force fit for its Contraction, whereby it is determined to contract itſelf, and does contract by the Influence of the animal Spirits, as ſoon as the *Monogaſtrick Muſcle* is again ſtretched in the Manner above explained.

We come now to examine another Part of the internal Ear, *viz.* the *Labyrinth*, externally and internally: But I muſt firſt obſerve, that the Bone, of which the inner Partitions of its Cavities are compoſed, is hard, and very compact. And this ſeems to be ſo ordained by Nature on Purpoſe,

that

that the ſonorous Rays ſtriking againſt thoſe Partitions, may loſe nothing, or at leaſt very little of their Motion, and therefore communicate the ſame Sound, or almoſt the ſame, which they receive from ſonorous Objects, to the animal Spirits contained within the Expanſions of the *ſoft Portion* of the *Auditory Nerve*, which are variouſly diſtributed in the Cavities of the *Labyrinth*.

In the *Labyrinth*, which Nature has dug out in the *Os Petroſum*, and the Structure of which we can never ſufficiently admire, there are only three Things remarkable to be obſerved externally; *viz.* the bony Partition in its upper Part, dividing the three *Semicircular Canals* from one another, and two *Apertures* ſituated pretty nigh one another, which afford a Paſſage for the *Æther*, from the Cavity of the *Tympanum* into the *Labyrinth*. This bony Partition is ſomething ſingular in this, that internally it is full of very ſmall Cavities, within which is ſpread an infinite Number of Capillary Blood Veſſels, and indeed the Blood which theſe Veſſels carry, by its gentle Heat nouriſhes and keeps up the natural Motion of the animal Spirits in the Pores of the nervous Membranes, which line the Semicircular Canals of the *Labyrinth*, and ſo hinder them from being too much condenſed, and ſo becoming unfit for the Office of this Organ. There are two *Apertures* dug out in this Part of the *Os Petroſum*, which makes the Baſis of the *Labyrinth*. The firſt has an Oval Figure, and is ſituated a little higher than the other; and as it opens into the *Concha*, and conſequently into the inner Parts of the *Labyrinth*, ought in my Opinion to be called the *Feneſtra* or *Window* of the *Labyrinth*. I have ſaid, not unjuſtly, that this *Aperture* opens into the inner Parts of the *Labyrinth*, becauſe it is cut out of the Portion of the *Concha*, which is that Part of it, by Means of which there is a Communication between theſe inner Parts, as will be explained below. To this *Window* the Baſis of the *Stapes* is applied, and ſhuts it, as long as the Muſcles of the internal Ear are at Reſt; and on the contrary, it opens it a little when either of theſe Muſcles is contracted, as we have already ſhewn. The other *Aperture*, which is almoſt round, I call the *Gate* of the *Labyrinth*; becauſe it affords an Entry into a little round Cavity, which is the Paſſage into the *Labyrinth*. For this ſmall Cavity communicates with the Extremity of the *Semi-oval Spiral Duct* of the *Cochlea*, and with the *Concha*, by a *Chink* cut out in its Baſis, and therefore with the *Semicircular Canals* to be afterwards deſcribed, as will by and by be explained. Theſe Things being conſidered, every Body muſt ſee, that I have called this laſt *Aperture* very juſtly the *Gate* of the *Labyrinth*. This *Gate* is covered with a very fine Membrane, which from its delicate Texture, will allow an eaſy Paſſage to the *Æther* carrying along with it the Impreſſions of ſonorous Objects into the *Labyrinth*.

The *ſmall Cavity* behind the *Gate* of the *Labyrinth*, I think, may be called its firſt *Porch*; becauſe this leads into the *Cochlea*, and the *Concha*, which is called by the famous *Du Verney*, the *Porch* of the *Labyrinth*. So that the *three Semicircular Canals* of the *Labyrinth*, and the *Cochlea* are, as it were, two different Apartments in it, ſeparated from one another by Means of the *Concha*, and at the ſame Time communicating together by its Means; wherefore I call it the ſecond *Porch* of the *Labyrinth*. This very fine Membrane, which ſhuts up the *Gate* of the *Labyrinth*, as I ſaid above, is produced into its firſt *Porch*, and lines it quite internally. It likewiſe ſhuts up the little *Chink* in the Baſis of the *Concha*, and the Extremity of the *Cochlea*, ſo that it adheres to the fine nervous Membranes which line the Cavities of the *Concha* and *Cochlea*, and by their Means communicates with the *ſoft Branch* of the *Auditory Nerve*. The ſecond *Porch*, which is the ſame with the *Concha* of all the old Anatomiſts, is larger than the firſt, and its Cavity, which is almoſt round, is about two Lines in Diameter, ſo that in Adults it can contain almoſt two Grains of Wheat divided into three or four little Portions, as I have frequently tried. In it there are nine *Apertures* to be obſerved; *viz.* two very ſmall, and almoſt inſenſible *Foramina*, which afford a Paſſage into it for two ſlender Twigs of the *ſoft Portion* of the *Auditory Nerve*, to be deſcribed below; a pretty long *Chink* in its Baſis ſomewhat crooked; an oval Orifice in that Side of it which is towards the Cavity of the *Tympanum*, called by the old Anatomiſts *Feneſtra Ovalis*; and the Mouths of the three *Semicircular Canals*, which are no more than five; becauſe the upper Canal, in its back Part, communicates in ſuch a Manner with the lower, as that they open with one common Orifice into the Cavity of the *Concha*. Hence, with the later Anatomiſts, I call this Orifice the *common Gate*. Each of the Orifices of the *Semicircular Canals* reſembles pretty much in its Figure the Mouth of a Trumpet; and indeed, if you examine carefully the Cavities of theſe Canals, you will ſee with the naked Eye, that they become gradually larger and larger from the Middle towards the Extremities, and therefore they muſt end in the ſame Figure as a Trumpet. Theſe Orifices we are now ſpeaking of are ſo diſpoſed, as that two of them open above, and two of them below, into the Cavity of the *Concha*, while the fifth is ſituated pretty nigh the *Chink* on the Baſis of this Cavity.

In the outer Part of the ſecond *Porch* of the *Labyrinth*, are ſituated three ſmall round *Canals*, which I call *Simicircular* upon Account of their being bended into that Figure; and this Name they have had from all the later Anatomiſts. But to diſtinguiſh them from one another, I ſhall give them diſtinct Names from their different Situations. The firſt I ſhall call *Upper*, becauſe it ſurrounds the *upper Arch* of the *Concha*; the ſecond, *Lower*, becauſe it ſurrounds the *lower Arch*; and the third I ſhall call the *Middle one*, bcauſe it is ſituated between the other two. The *upper Semicircular Canal*, as ſoon as it riſes from the *Veſtibulum*, turns bending upwards, and after it has deſcribed a little more than Half a Circle, and has got as far as the Middle of the back Part of the *Os Petroſum*, it is joined to the lower Canal, as will preſently appear. The *lower* again riſes from the Bottom of the *Concha*, and after it has deſcribed a little more than Half a Circle, it is joined to the *upper* one; as has juſt now been ſaid. Therefore theſe two Canals are plainly united into one, which running obliquely, ends in a common Orifice in the *Concha*. The *middle Semicircular Canal* has two ſeparate Orifices, and deſcribes no more than Half a Circle. The internal Surface of theſe Canals is very ſmooth; they are for the moſt Part round within, and ſometimes inclined to an oval Figure.

In that Side of the ſecond *Porch* of the *Labyrinth*, which is oppoſite to the *three Semicircular Canals*, and is the moſt internal, is ſituated the other Apartment of the *Labyrinth*, called the *Cochlea*. I divide the *Cochlea* into two Parts, the firſt of which retains the Name of *Cochlea*, and has a Cavity which can eaſily admit a pretty large Lentil ; and the other Part is called the *Semi-oval Spiral Canal*. That Portion of the *ſoft Auditory Nerve*, which is diſtributed through the *Cochlea*, being removed, you may obſerve a bony Subſtance connected to the Middle of its Baſis, of about a Line long, of a *Spiral Figure*, and ſomething pyramidal, and therefore is called the *Pyramidal Nucleus* of the *Cochlea*. This *Nucleus* of the *Cochlea* about its Middle lateral Part, and inwards with regard to the Head, reſts upon a thin pellucid bony Plate, which partly makes the Margin of the Orifice of the *Semi-oval Spiral Canal*, and partly makes the inner Side of the ſecond Turn of the *Spiral Lamella*, which winds about the *Pyramidal Nucleus* juſt now mentioned ; ſo that the ſecond Turn of this *Spiral Lamella* is partly bony, and partly nervous. In the Middle of the Structure of the *pyramidal Nucleus*, there is dug out a *Foramen*, which is very obſervable. In Adults, not far from the Top of this *Nucleus*, may be obſerved a very ſlender bony Prominence, ſomewhat round, and about a Quarter of a Line broad, adhering to the internal Surfaces of the *Cochlea*, which therefore I call the *orbicular Apophyſe* of the *Cochlea*. There is a ſmall Cavity dug out in the Middle of the Bone, which forms the Extremity of the *Cochlea*. The whole internal Surface of the *Cochlea* is very ſmooth, and when examined with a Microſcope, it appears perforated with a great many ſmall *Foramina*, eſpecially in that Part which ſurrounds the Baſis of the *Pyramidal Nucleus*. The ſecond Part of the *Cochlea* is the *Semi-oval Spiral Canal*, as we obſerved above, which is ſtretched from the Baſis of the *Cochlea*, where it has its Beginning, to the upper Part of the firſt *Porch* of the *Labyrinth*, and to the *Chink* which is formed in the Baſis of the ſecond. It has a *Semi-oval Spiral Cavity*, a little broader towards its Extremity than at its Beginning. The ſoft *Medullary Portion* of the *Auditory Nerve*, which is ſpread within the *Cochlea*, being removed, you may obſerve a very thin bony Proceſs, which reaches from the internal Side of the Baſis of the *Pyramidal Nucleus* of the *Cochlea*, as far as the Extremity of the ſame *Nucleus*. This bony Proceſs, as it is very thin and narrow, I call the *bony Line* of the *Semi-oval Spiral Canal* of the *Cochlea*. All the internal Surface of this Canal is perforated with a great many *Foramina* and extreamly ſmooth, as I ſaid before, if you except that Part of it, where the bony Line, juſt now deſcribed, is prominent.

The *ſoft Portion* of the *ſeventh Pair of Nerves* is larger than the *Portio Dura* or *hard Portion*, as it is called, though it receives much fewer *Medullary Fibres* than the other from the *Articular Proceſs* of the *Brain*. As ſoon as it has entered the Cavity of the Ear, it divides into three Branches, *viz.* the *upper*, *lower*, and *middle*. The *upper* Branch enters the Cavity of the *Concha*, by a *Foramen* peculiar to it in the upper Part of the *Concha*, and there it is ſpread out into a very fine, thin, ſoft Membrane, which lines all its Surface. But there is one Fibril of it which retains the Figure of a very ſmall Nerve, and adheres to this ſmall, ſharp, bony *Apophyſe*, at the Margin of the above-mentioned *Foramen*, which upon Account of its unequal Surface, and being covered with the white nervous Membrane already deſcribed, ſomewhat reſembles a ſmall white Creſt. That ſoft, delicate, little Nerve, which is accompanied with a ſmall Artery and Vein running contiguous to it, as ſoon as it leaves the bony *Apophyſe* to which it is connected, is ſtretched tenſe like a Rope through the Middle of the *Concha*, till it gets as far as the united Orifice of the *upper* and *lower Semicircular Canals*, to which it adheres, and then entering that Orifice, it is immediately ſpread out into two very fine Membranes, one of which lines the whole Inſide of the upper *Semicircular Canal*, and the other that of the lower. The loweſt and leaſt Branch of the *ſoft Portion* of the ſeventh Pair of Nerves, after ſending off one or two very ſmall inſenſible Fibrils, which are diſtributed to that Part of the *Os Petróſum* where the *Semicircular Canals* lie, enters by a ſmall *Foramen* into the lower Part of the *Concha*, and there being ſpread out, it ſpends itſelf in forming that thin Membrane which lines the inner Surface of the *Concha*, as was ſaid above, excepting only a very ſmall Portion of it, which enters the Middle *Semicircular Canal*, by a *Foramen* a little below this common Orifice above-mentioned, and there is expanded into a very fine Membrane, lining all the internal Surface of this Canal. Thoſe delicate, thin Membranes, which line internally the *Semicircular Canals* of the *Labyrinth*, are provided with a great many very ſmall Blood Veſſels, for the moſt Part not to be diſcovered by the Eye, ſeeing they contain only a very ſmall Quantity of Blood within their ſlender Cavities. Theſe ſubtile Membrane, being moiſtened with a limpid attenuated ſpirituous Fluid, eſpecially in young Children, are ſo very ſoft, that it is ſcarce poſſible to touch them with any Inſtrument, though ever ſo ſlightly, without tearing them. Beſides, if you expoſe them to the Heat of the Sun Beams, they dry immediately, and become ſo brittle, that if you diſturb their Situation, they divide into little Bits, crumble, and fly away in a very fine Powder. That limpid ſpirituous Fluid too, with which theſe Membranes I ſaid were perpetually moiſtened, and which ſeems to be nothing elſe than the animal Spirits ſomewhat condenſed here by the natural Coldneſs of the Part, flies off in a Moment, upon opening the *Semicircular Canals* of the *Labyrinth*, which I have found full of it in new-born Infants. But this could not happen, if the five Orifices of the *Semicircular Canals* of the *Labyrinth*, which open into the *Concha*, were not naturally ſhut up by this nervous Membrane above deſcribed. And I make no Doubt but this Fluid enters inſenſibly the Pores of the nervous Membrane of the *Concha*, and hinders it from becoming too dry, thereby preſerving it in a proper Tone for exciting Sound. From what has been ſaid it is plain, that the *Chink* in the Baſis of the *Concha*, the *Feneſtra Ovalis* and the five Orifices of the three *Semicircular Canals* of the *Labyrinth*, are all ſhut up by that thin nervous Membrane which lines the Cavity of the *Concha*, as I ſaid above.

The *Middle Branch* of the *ſoft Portion* of the *ſeventh Pair of Nerves*, near that Part of the *Os Petroſum*, which is the Baſis of the *Pyramidal Nucleus* of the *Cochlea*, ſends off a Number of Fibrils, which as ſoon as they enter the *Cochlea*, accompanied with very ſmall Arteries and Veins, change their Form, and are diſpoſed and diſtributed in the following Manner. In the firſt Place, that thin Coat which they had from the *Pia Mater*, is ſo unfolded, as to end in a very fine Membrane, well ſtored with Blood Veſſels, which firſt covers the Surface of the Baſis of the *Pyramidal Nucleus* of the *Cochlea*, and every Thing contained in it, as far as the *ſecond Turning* of the *Spiral Lamella* of the ſame *Nucleus*. After this it is continued into the *Semi-oval Spiral Canal* of the *Cochlea*, and expanded ſo as to ſhut up its Extremity, and line not only its whole internal Surface, but likewiſe both Sides of the *Spiral Lamella*, juſt now mentioned. But this Membrane, being of an extreme thin Texture, does not hinder the *Æther* from paſſing conſtantly and quickly from the *Tympanum* into the *Labyrinth* and all its Receſſes, although it ſhuts up the Extremity of *the Semi-oval Spiral Canal* of the *Cochlea*, as has juſt been obſerved. Hence I ſaid before, that it went to the *Labyrinth* in the Cavity ſituated behind the *Gate*. As to the *Medullary Subſtance* of the nervous Fibrils of which we are now treating, one *Portion* of it goes to form the *ſecond Turn* of the *Spiral Lamella*, which winds about the *Pyramidal Nucleus* of the *Cochlea*, the inner Side of which *Turn* is intirely bony, as I already hinted. The *other Portion* again goes firſt to form the Beginning of the *Spiral Lamella*, which does not become quite nervous till towards the *Middle* of that *Turn*, and being continued on to the *Semi-oval Spiral Canal* of the *Cochlea*, it ends in a *nervous Spiral*, *Semi-oval Lamella*, which is placed there, and adheres by its thicker Edge to the bony Line within this *Canal*. So that the Beginning of the *Spiral Lamella* of the *Pyramidal Nucleus* of the *Cochlea*, is likewiſe the Beginning of the *Semi-oval Spiral Lamella*, juſt now deſcribed. But this *Spiral Semi-oval Lamella*, being continued to the further End of the *Canal* in which it is contained, adheres by its Extremity which is become a little ſharpened, to the Middle Part of the *Chink* in the Baſis of the *Concha*, and therefore it divides that *Canal* into two Parts, which have no ſenſible Communication with one another. Theſe two Parts of the *Spiral Semi-oval Canal* of the *Cochlea*, are ſo diſpoſed, as that the firſt, which is placed inwards, has a Communication with the firſt and ſecond *Porches* of the *Labyrinth*; and the ſecond, which is placed towards the *Tympanum*, and conſequently outwards, communicates only with the *Concha*. The Middle Branch of the *ſoft Portion* of the *ſeventh Pair of Nerves*, having ſent off the ſlender Fibrils already deſcribed, enters a ſmall *Foramen* in the Middle Subſtance of the *Pyramidal Nucleus* of the *Cochlea*, accompanied with a ſmall Artery and Vein, and as ſoon as it has got out there, its Coat from the *Pia Mater* is ſpread out ſo as to line whatever is contained from the *ſecond Turning* of the *Spiral Lamella* of the *Pyramidal Nucleus* of the *Cochlea*, which, as I ſaid above, is partly bony and partly nervous, as far as the Extremity of the ſame *Cochlea*. Its *Medullary Subſtance* again ends in the *third Turning* of the *Spiral Lamella*, juſt now mentioned, which reſts upon its Circumference, and adheres to the *Orbicular Apophyſe* of the *Cochlea*. The laſt Part of it is expanded into a fine Membrane, which being gathered in on all Sides, as it were, is applied and adheres to a ſmall *Fovea* dug out in the Middle of the Extremity of the *Cochlea*, and ſo forms a ſmall Cavity reſembling a blind Pouch, in which nothing but innate Air is included.

From what has been ſaid it appears, that the *Spiral Lamella* within the Cavity of the *Cochlea*, conſiſts only of two whole Turnings and a Half, which are diſtinguiſhed from one another by ſmall Cavities filled with innate Air, and do not ſenſibly communicate together. Here it muſt be obſerved, that the *Spiral Lamella* which winds about the *Pyramidal Nucleus* of the *Cochlea*, and the *ſemi-oval Spiral Lamella* confined within the *Semi-oval Spiral Cavity* of the ſame *Cochlea*, as alſo the three very fine nervous Membranes lining the internal Surface of the *Semicircular Canals*, are all moiſtened with a very limpid ſpirituous Fluid, eſpecially in new-born Infants, which is viſible upon firſt opening the *Cochlea*, but immediately diſſipates. But the *inner Medullary* and true nervous Subſtance of the above *Lamella*, dries very ſoon, and becomes very brittle, if expoſed a little while to a warm Air, as before obſerved.

What I have juſt now ſaid concerning the *ſoft Branch* of the ſeventh Pair of Nerves, makes it to me ſeem very clear, that the *two Spiral nervous Lamellæ* above deſcribed, together with the ſlender nervous Membranes lining the *Concha* and the *three Semicircular Canals*, conſtitute the immediate compleat Organ of Hearing; ſo that according to the different Motions excited in the animal Spirits contained within the Pores of theſe Membranes by the Objects of Sound, and communicated to the *Senſorium Commune*, there will be produced different Ideas of Sound in the Mind.

The Structure of the Noſe; by M. du Verney. *n.* 139. *p.* 976.

XIX. 1. M. *Du Verney* hath obſerved that the Cavities of the Noſe are filled with many cartilaginous Laminæ, diſtinct one from another; every Laminæ being divided into many others, all folded almoſt into a Spiral Line: And that the *Os Cribroſum* is made up of the Extremities of theſe *Laminæ*, which butt upon the Root of the Noſe, the Holes wherewith it is pierced, being the Intervals between the *Laminæ*. They are deſigned to uphold the inner Tunick of the Noſe; which Tunick, being a principal Organ of Smelling, hath received from Nature a very great Expanſion, being folded round about together with theſe *Laminæ*, that by this induſtrious Mechaniſm ſhe may employ all its Length in a very little Room. This Tunick is filled with an innumerable Company of ſmall Rays, ſo many Branches of Arteries and Veins, and eſpecially Nerves, by which it hath a moſt exquiſite Senſe: By its great Expanſion, a greater Number of the ſubtile Particles of odoriferous Bodies ſtrike it at the ſame Time, and ſo render their Impreſſion more ſtrong; and by the Labyrinth, made by the Windings of the *Lamellæ*, they are arreſted, and make a longer Stay before they paſs off from thence into the Breaſt. For the ſame Reaſon Nature has furniſhed the ſaid Tunick of the Noſe with a great many ſmall Glands, which open thereinto, and ſo moiſten it with a thick and ſlimy Exudation, the better to intangle the dry odoriferous Particles.

This Tunick being compared in ſeveral Animals ſhews much of the Reaſon of the Delicacy of Smelling in ſome, above what it is in others.

For look how much a finer Noſe it is that Animals have, they have likewiſe ſo much a greater Number of theſe *Lamellæ*, wherewith the ſame Tunick is rolled up in ſo many more Folds. So the Noſe of a Hound is better furniſhed with them than that of any other Animal. The Hare, Fox, Cat, wild Boar, have a conſiderable Number of them. Thoſe Animals that chew the Cud have fewer. And Man is leſs provided for than any of the reſt.

By ——— Ib. p. 977.

2. Not only the Number, but the Length alſo of the *Lamellæ*, is of great Uſe for the Strength of Smelling: For which Purpoſe moſt Quadrupeds, which either Hunt, as *Carnivorous*, or diſtinguiſh their Food by the Smell, as the *Graminivorous*, have their Noſe not placed in the Middle of the Face, as in Man; but prolonged to the very End.

The Original of a Polypus; *by* M. Giles, *n.* 226. *p.* 472.

XX. 1. In *June*, 1684, I was called to a Patient who had a *Polypus* in the right Noſtril. I drew it out without Pain, or any bad Accident: But after this Extraction, ſhe ſtill felt ſome Trouble in her Noſe, and Moiſture did paſs with Difficulty from the Noſe to the Throat. This engaged me, ſeeing no more in the Noſtrils, to look into the Mouth, where I perceived behind the *Uvula*, a ſtrange Body of the Bigneſs of half a Nut, which I judged to be a Portion of the ſame *Polypus*; and being encouraged by the Advice of M. *Fede* and M. *Vary*, I pulled it out in their Preſence. We found it of an extraordinary Shape, the Piece by which I laid hold of it was hard, and of a dark Brown; it was faſtened by two Branches, which ſeemed to have taken their Shape in the Noſe, being each of them as big as a ſweet Almond, but their Subſtance was ſofter and whiter; it had alſo a little Stalk, ſomething red, of the Bigneſs of a Cherry-Stalk. There was not a Drop of Blood ſpilt, and the Patient felt no Pain in the Operation; all Trouble was removed, and the Liquor paſſed eaſily.

By ——— Ib. p. 473.

At the End of two Years the Patient died of a Malignant Fever; and forasmuch as ſome Time before her Death, ſhe complained of a new Trouble in her Noſe, we obtained Leave to open this Organ. After we had broken the Bone, we found nothing in all the Noſe but a little Piece of Fleſh very ſoft, which came out of a Cleft of the *Proceſſus Pterygoides*: We followed it exactly, which brought us into the Sinus of the upper Jaw: We broke this Bone alſo, and perceived in this Sinus a ropy and clear Humour; in the Middle of which there was a Body like in Figure, Conſiſtence and Colour, to a greater one, which we had before taken out: We took Notice alſo of a little red Speck, which ſeemed to be the Root of this *Polypus*.

2. The *Polypus's* are ſpungy Excreſcencies, which, according to Authors, are formed upon the Membrane that covers the Noſe within, by ſome Alteration made there: Some are formed alſo in other Parts, as in the Cavities of the great Veins. But this Membrane is more diſpoſed to the Production of them than others, becauſe it is the moſt ſpungy of the whole Body, and moſt full of Blood-Veſſels. When theſe Excreſcencies appear very red and full of Blood, the Extirpation of them is dangerous, for fear of an *Hemorrhagie*, which is not eaſily ſtopped; therefore ſome do uſe Cauſticks of ſeveral Sorts with good Succeſs.

The Organ of Taſte; by S. Malpighi. *n.* 27. *p.* 492.

XXI. 1. *S. Malpighi* hath diſcovered in the Tongue many little Eminencies, which he calls *Papillary*, and believes to be the principal Organ of *Taſte*.

By S. Fracaſſati, *ib.*

2. *S. Fracaſſati* obſerves, that as the Tongue hath towards its Point many Eminencies, by the Means whereof it goes, as it were, to meet Objects of Taſte, ſo on the contrary, it hath many Cavities towards its Root, wherein it receives them. All which Cavities terminate in Nerves, and ſeem to ſerve for Funnels to convey the Aliment into them: Which maketh the Author think it very probable, that the fineſt Part of the Aliment paſſeth immediately from the Tongue into the Nerves; whence it comes to paſs that Wine, being only taken into the Mouth, reſtoreth Vigour preſently.

A new Salival Duct diſcovered by Caſp. Bartholine, *n.* 164. *p.* 749.

XXII. All the Glands which furniſh Saliva to the Cavity of the Mouth, and all their Excretory Veſſels which open diſtinct into the Mouth, are accurately deſcribed by *Steno* in his Anatomical Obſervations of the Glands of the Mouth. Some of theſe Glands have only one Excretory Veſſel, and ſome of them have more. Thoſe Veſſels which are more numerous, but ſmall, are proper to the Glands which are ſcattered up and down upon the Cheeks, under the Tongue, in the Palate, and Tonſils. But the larger Veſſels, which go out ſingle from the Conglomerate Glands, hitherto at leaſt are only obſerved to be two, the upper of which riſes from the Parotid Gland, and was firſt found and deſcribed by *Steno*; the lower again, which was firſt delineated by *Wharton*, takes its Origin from the *Maxillary* Gland of the Lower-Jaw. But to theſe two juſt now mentioned ought to be added a third, of the ſame Kind, which I firſt diſcovered the thirteenth of *March* 1682. and which likewiſe deſerves to be called inferior, ſeeing it riſes from the Sublingual Gland, accompanies *Wharton*'s Duct, and opens under the Tongue in the Place with *Wharton*'s, and with an Orifice as conſpicuous. For as I was ſearching in a Calf's Head, with the End of my Probe, for *Wharton*'s Duct, deſigning to proſecute it to its Origin, in the lower *Maxillary Gland*, by Chance the Probe went into another Duct, and diſcovered ſomething before unknown to me. I imagined that this Duct would lead me to *Wharton*'s Gland, but about the Middle of the Tongue, conſidering it lengthwiſe, on its lower Part laterally, where *Wharton* ſays his Duct is covered with the Skin and a glandular Kind of Fat, there this Duct I now deſcribe directed its Courſe towards another Gland of the Conglomerate Kind, next to thoſe Glands from which the ſeveral Ducts, which *Steno* calls ſublingual, take their Origin. For that Gland (which in ſome Animals is placed nigher the inferior *Maxillary*, and is pretty large, while in others it is leſs, and ſituated more towards the Extremity of the Lower-Jaw) as it is of the ſame Structure with *Wharton*'s lower *Maxillary Gland*, ſo it has likewiſe an Excretory Veſſel very conſpicuous, whoſe lateral Ducts riſing from all the Folliculi of the Glands, terminate in one common pretty large Trunk, which accompanies in a ſtreight Courſe the Duct deſcribed by

Wharton, and opens into the Mouth within the Gums at the Extremity of the Lower-Jaw, between ſome flat rigid *Papillæ*, adhering ſtrongly to the *Maxilla*.

Such appeared to me firſt at that Time this Duct with its Gland in the Head of a Calf, and this Obſervation was afterwards frequently confirmed in other Animals. In a Sheep, the Extremity of this Duct terminates in the *Papillæ* themſelves which are under the Tongue in the Lower-Jaw, and near it in the ſame *Papilla* the Orifice of *Wharton*'s Duct appears. In a Bear, each Duct opens in its proper *Papilla*, protuberating near the *Frenum* of the Tongue. In a Lioneſs, which his Majeſty was ſo good as to indulge us with lately in the Anatomical Theatre, the Orifices of theſe Ducts terminate at the *Frenum*, but ſo as each of them has a Kind of ſmall *Frenum* peculiar to itſelf, which is forced by the internal Membrane of the Mouth. But the Gland from which this Duct which I have diſcovered riſes, in the Lion, is large and of an oblong Figure, one Part of it reaching as far as *Wharton*'s Gland; and as it is compoſed of different Bundles of little Glands, ſo the different Ramifications coming from them are ſent to the common Duct, which is compoſed of other ſmaller ones joined together without the Gland, and proceeds in a ſtreight Courſe to the Termination of *Wharton*'s Duct. I obſerved lately in a Wolf a like Diſtribution and Termination of the ſame Veſſels, and the Situation and Shape of the Glands almoſt the ſame. But to make every Thing plainer about it, I have added two Figures, taken from the Anatomy of a Lioneſs, ſhewing the Courſe as well as the Termination of this Duct.

Explication of the Figures. Fig. 6. *Figure firſt*, ſhews the lower *Maxillary Gland* A, with *Wharton*'s Salivary Duct B B, as alſo the neighbouring ſublingual Gland C, with its Salivary Duct D, now firſt deſcribed by me, the various Ramifications of which are ſeen diſperſed through the whole Gland.

Fig. 7. *The other Figure*, ſhews the Orifices of the inferior Salivary Ducts, two of each Side, *viz.* *Wharton*'s and *mine*, the Situation of which under the Tongue is marked by the Extremities of the Probes, a a a a, going out by the ſaid Orifices under the Tongue b, which here is pulled up a little from the Lower-Jaw c, that the other Parts may be the better ſeen.

XXIII. *Accounts of Books and Additions omitted.*

n. 22. *p.* 397. ANatome Medullæ Spinalis, & Nervorum inde provenientium; *Gerardi Blaſii.* M. D.

n. 29. *p.* 553. 2. Tetras Anatomicarum Epiſtolarum, *Marcelli Malpighii* & *Caroli Fracaſſati*, de Lingua & Cerebro; *Bononiæ*.

n. 64. *p.* 2081. 3. *Franc. Joſ. Burrhi* Epiſtolæ duæ ad *Thomam Bartholinum*. Hafniæ. 1669. in 4°.

n. 174. *p.* 1144. 4. *Raymundi Vieuſſens*, M. D. *Monſpelienſis*, Neurographia Univerſalis. *Ludg.* 1685. in *Fol.*

5. The Anatomy of the Brain, containing its Mechaniſm and Phyſiology, together with ſome new Diſcoveries and Corrections of antient and modern Authors upon that Subject: To which is annexed, a particular Account of Animal Functions and Muſcular Motion; by *Henry Ridly*, M. D. *n.* 215. *p.* 32.

6. Pathologiæ Cerebri & Nervoſi Generis Specimen; in quo agitur de Morbis Convulſivis & Scorbuto; Studio *Thomæ Willis*. M. D. *n.* 31. *p.* 600.

7. *Antonii Molinetti* Diſſertationes Anatomicæ & Pathologicæ de Senſibus & eorum Organis; *Patavii.* 1669. in 4°. *n.* 67. *p.* 2059.

8. Ophthalmographia, ſive Oculi ejuſque partium Deſcriptio Anatomica; cui acceſſit Nova Viſionis Theoria, *Regiæ Societati Lond.* propoſita per *Guil. Briggs*, M. D. Editio altera. 1685. in 8°. *The Theory of Viſion, and the Continuation of that Diſcourſe, were at firſt inſerted in theſe Papers in* Engliſh: *But the Author, a few Years after, tranſlated them into* Latin, *and annexed them to his* Ophthalmograpia *(in this Second Edition) to which they properly belong.* *n.* 129. *p.* 746. *n.* 175. *p.* 1186. *Ph. Col. n.* 6. *p.* 167. *n.* 147. *p.* 171.

9. 1. A new Diſcovery touching Viſion; in an Epiſtle of the Diſcoverer M. *L'Abbé Mariotte* of *Lyons* to M. *Pecquet*, and the Anſwer to it. *The Subſtance of both is here inſerted in* Engliſh. *n.* 35. *p.* 668.

2. The Anſwer of M. *Mariotte* to M. *Pecquet*, about the Opinion that the *Choroeides* is the principal Organ of Sight; *Engliſhed and inſerted here.* *n.* 59. *p.* 1023.

3. M. *Mariotte* of Viſion.

4. Two Letters of M. *Perault*, and M. *Mariotte*, concerning Viſion. *Paris*, 1682. *n.* 74. *p.* 2217. *n.* 149. *p.* 265.

10. Traité de l'Organe de l'Ouie par M. *du Verney*. *Paris*, in 8°. *Ib. p.* 259.

11. Guſtus Organum, per *Laurentium Bellini*, noviſſimè deprehenſum. *n.* 20. *p.* 366.

12. *Ant. Nuck* de Ductu Salivali novo, Saliva, Ductibus Aquoſis, & Humore Aqueo. *Lugd. Bat.* 1686. *n.* 177. *p.* 1244.

CHAP. III.

The NECK. *The* THORAX.

I. Sitting in ſome Company, and having been but a little before Muſical, I chanced to take Notice that in ordinary Diſcourſe, Words were ſpoken in perfect Notes, and that ſome of the Company uſed Eighths, ſome Fifths, ſome Thirds; and that his Diſcourſe which was moſt pleaſing, his Words, as to their Tone, conſiſted moſt of Concords; and where of Diſcords, of ſuch as made up Harmony. The ſame Perſon was the moſt affable, pleaſant, and the beſt natured in the Company. This ſuggeſts a Reaſon,

A Conjecture at Diſpoſitions from the Modulations of the Voice; by ——— *n.* 140. *p.* 1011.

ſon, why many Diſcourſes which one hears with much Pleaſure, when they come to be read ſcarce ſeem the ſame Things.

From this Difference of Muſick in Speech, we may conjecture that of Tempers. We know the *Dorick Mood* ſounds Gravity and Sobriety; the *Lydian*, Buxomneſs, and Freedom; the *Æolique*, ſweet Stillneſs, and quiet Compoſure; the *Phrygian*, Jollity and youthful Levity; the *Ionique* is a ſtiller of Storms and Diſturbances ariſing from Paſſion. And why may we not reaſonably ſuppoſe, that thoſe whoſe Speech naturally runs into the Notes peculiar to any of theſe *Moods*, are likewiſe in Nature hereunto congenerous? So alſo from the *Cliff*; as he that ſpeaks in *Gamut*, to be Manly; *C Fa ut*, may ſhew one to be of an ordinary Capacity, though good Diſpoſition; *G Sol Re ut*, to be peeviſh and effeminate, and of a weak and timorous Spirit; *Sharps*, an effeminate, *Flats*, a manly, or melancholick Sadneſs. He who hath a Voice which will, in ſome Meaſure, agree with all *Cliffs*, to be of good Parts, and fit for Variety of Employments, yet ſomewhat of an inconſtant Nature. Likewiſe from the *Times*; ſo *Semibriefs* may ſpeak a Temper dull and flegmatick; *Minums*, grave and ſerious; *Crotchets*, a prompt Wit; *Quavers*, Vehemency of Paſſion, and Scolds uſe them; *Semi-brief-Reſt* may denote one either ſtupid, or fuller of Thoughts than he can utter; *Minum-Reſt*, one that deliberates; *Crotchet-Reſt*, one in a Paſſion: So that from the natural Uſe of *Mood*, *Note* and *Time*, we may collect Diſpoſitions.

An Argument for the Uſe of Laryngotomy: *by Dr.* William Muſgrave. *n.* 258. *p.* 398.

II. *Laryngotomy* is highly to be valued, for that in the greateſt Extremity, when a Man is in moſt imminent Danger of Suffocation, and to all Appearance within a very few Minutes of his laſt, by opening a new Paſſage for Breath, it gives ſpeedy and certain Relief, and this when all other Methods fail, and without any conſiderable Injury from the Inſtrument. The Patient in a Minute or two is brought from the Struggles of Death to a State of Complacency, Eaſe and Security. In the large Field of Practical Phyſick, perhaps, there is not any one Method that works ſo great a Change, for the better, in ſo ſhort a Time. But we find this Operation very ſeldom practiſed, becauſe that Gap which appears on the Cutting a Throat (the divided Parts being then drawn to their other more fixed Ends) together with the great Efflux of Blood, when the Jugulars and Carotid Arteries are alſo wounded, create in moſt Men a Dread of this butcherly Operation, and make thoſe, eſpecially, who are unacquainted with Anatomy, ſuſpect all Wounds of the *Trachea* as mortal, and oppoſe *Laryngotomy* under all the moſt urgent Circumſtances.

But to wipe off this Prejudice, it may be affirmed that *Laryngotomy* is allowable, and ought to be put in Practice in violent *Quinſies*, and other Dangers of Suffocation from Cauſes of a like Nature with them. For that the Wound is curable (notwithſtanding the Authority of the *Encyclopædia Chirurgica* to the contrary) will appear by the following Relation ſent by Mr. *J. Keen* of *Roch* in *Cornwall*, the Chirurgian who performed the Cure.

Lib. II. *c.* iv.

Nicholas Hobb of *St. Endor* in *Cornwall*, aged 63, or thereabout, was ſometime in *March* 1696, at a Diſtance from any Houſe, ſet on by Ruffians, who firſt, by a Blow on the *Occiput*, knocked him to the Ground; then tranſected the *Trachea* ſomewhat beneath the *Pomum Adami*, together with ſeveral of the adjacent Muſcles, and ſome large Blood-Veſſels; from which he loſt a very great Quantity of Blood, ſeen afterwards lying on the Ground. The Ruffians having robbed him, and thinking him either dead, or paſt all Recovery, left him. After ſome Time the wounded Man recovers ſo much Senſe and Strength as to thruſt his Neckcloth into the large and gaping Wound, and by Degrees to crawl home to his own Houſe. When I had examined the Wound, and conſidering the great Flux of Blood, I was much ſurprized that the Patient was alive. *Lipothymies* came frequently upon him, eſpecially upon every little Motion of his Body: Theſe were after ſome Time ſucceeded by *Convulſions*. The Parts of the *Trachea* were at a vaſt Diſtance from each other, the lower Part being on every Turn of Inſpiration ſunk deep into the Neck, as low as the *Clavicula*, and juſt appeared upon every Expiration.

There ſeemed to be no manner of Hopes of his Recovery: However, in order to attempt it, I directed a luſty ſtrong Fellow to hold the Legs of the Patient over his Shoulders, and by this Means raiſe them, together with the *Abdomen*, above the *Thorax*, *Collum*, &c. in which Poſture the divided Parts came ſo near to each other, that with ſtrong waxed Thread I ſewed together ſeveral of them; but as to the Diviſions of the *Trachea*, I ſecured them together by paſſing large Needles deep into the Fleſh on each Side; and twiſting ſtrong waxed Thread about them, as in *Labio Fiſſo*. Over all, for greater Security, I applied a Reſtrictive (*ex Pulv. reſtrin. Clowes*) covering the greateſt Part of the Neck with a Defenſative *ex Bolo cum Albumine Ovor.* adviſing the Patient to lie as quiet as he could. The Patient now begins again to ſpeak, and as well as the Cough, Difficulty of Breath, and his Weakneſs would allow, ſoftly, and with a low Voice, gives an Account of the Occaſion as above.

An *Arteriac* was then made up for him (to ſmooth the *Trachea*, and promote Expectoration) è *Troch. Pectoral. Batean. (in Aq. Stephan.* ℥ß *Solut.)* ʒiij. *Syr. Tuſſilag.* ℥j.ß. *Balſamic.* ℥j. *Pulv. Aniſ. Glycyr. ana* ʒj. *Balſam. Sulphur. Terebinth.* ʒß. *Peruv. Gut.* vi. *cum Mellis opt. deſpumat. q. ſ. fiat Linctus per Bacillum Glycyr. ſæpius adhibend.* From the Uſe of which his Cough abated, and he diſcharged by Expectoration much grumous Blood and other Matter. As to the *Convulſions* and *Lipothymies*, I applied to his Noſtrils *Spir. C. C. Succin.* &c. and embrocated the back Part of his Neck with a Liniment *ex Ol. Lil. Alb.* ℥j. *Tereb. Succin. ana* ℥i. *N. M.* ʒß *Ung. Nervin.* ʒvj. *Miſ.*

The next Day I found the *Convulſions* had left him; nor had he from that Time any Return of them, or of the *Syncope*. But on the 4th Day the Stitches were torn open, the Wound appeared large enough to admit a middle ſiz'd Hand; a great Part of the *Oeſophagus* appeared in View much inflamed and ſcratched by the Inſtrument. The *Epiglottis* did not, as uſual, cover the *Rima* of the *Larynx*, ſo that I could eaſily ſee up into the Mouth, Part of the *Annular Cartilage* was cut obliquely, and hung only by a little Fibre to the upper Part of the *Larynx*, &c. Indeed I met with frequent Ruptures, the waxed Thread and Needles often fretting through the Fleſh they held; but I as often repeated the Stitches in the ſame Manner and Method as before. About the 10th Day, the largeſt Blood-Veſſels appeared conglutinated and covered with new Fleſh; the *Gula* of good Aſpect, the Inflammation of that and all the neighbouring Parts gone. I now dreſſed with *Liniment. Arcei.* On the 11th Day, the Symptomatick Fever was in a Manner gone, and the Wound under the Circumſtances of good Digeſtion. In the mean Time the Diet, when he could ſwallow, was of Mutton-Broth, Ale-Meat, Poach'd Eggs. The Cough continuing a long Time very ſevere, was at length overcome by duly adhering to the *Linctus* aforeſaid, with repeated Boles of *Balſam. Lucatel. Conſ. Roſar. Rub. Horâ Somni*, with a Draught of a Pectoral Decoction, uſed alſo inſtead of common Drink. To mitigate the Violence of it, and procure him Sleep, the following *Hauſtus* was frequently uſed, and never failed our Expectation. ℞ *Ol. Amygdal. Dul. rec. Expreſſ.* ℥ß. *Syr. de Mecon.* ʒ vi. *Laud. Lond.* (*Aq. Step.* ʒij. *Solut.*) *gr.* ij. *fiat Hauſtus Horâ Somni Sumendus.*

About the 11th and 12th Days, we plainly diſcovered little Portions of new Fleſh ariſing, not only from the carneous Membrane incumbent on the Gullet, but alſo out of the Subſtance of the Cartilages themſelves, both on the upper and lower Parts of the divided *Trachea*. The external, containing Parts of the Neck, began now to unite by Incarnation; new Fleſh ariſing, and apparently leſſening the Dimenſions of the Wound, every Time there was a Laceration of the Stitches, inſomuch that two Needles were now ſufficient, whereas I uſed in the Beginning not leſs than ſix. And thoſe carneous Portions, both of the *Trachea* and exterior Parts, gradually joining and intermixing, became one ſolid *Cicatrix* from each End of the Wound almoſt to the Middle of the Wind-pipe, where the Air continued in ſome Degree to have an Exit. About the 15th Day I removed ſeveral Pieces of Bones which had contracted a *Caries* in the *Cartilage* (which in this old Man, as in many others, was grown *Oſſeous*) and were thruſt out by the new Fleſh. He now ſwallows with little Trouble, eats ſufficiently, and nouriſhes in Proportion. The Aperture about the 26th Day was almoſt cloſed up, and in 4 or 5 Days more the Sides of the Wound were perfectly joined and *cicatriſed*, the *Trachea* performing its Part in Reſpiration, as at other Times, without any conſiderable Inconvenience. He ſpeaks indifferent well, but is forced to take Care in ſwallowing, the *Rimula* not being exactly ſhut as before the Wound, which makes Liquor of any Sort more apt to fall into the *Canal*, and ſo cauſe a Cough, Hoarſeneſs, *&c.* He does not ſwallow dry Meats as well as formerly, but in all other Reſpects is as well as ever.

The Structure of the Lungs; by M. J. Templer. *n.* 86. *p.* 5031.

III. Having blown into the *Aſpera Arteria* of Fowls, I obſerved Continuation of many Veſicles, extended from the *Bronchiæ* through the *Abdomen* to the *Anus* (which I conceive to be the Cauſe of the conſtant Motion of the *Anus* in Fowls, the Air having Ingreſs and Egreſs there) I thence conjectured the Subſtance of the *Lungs* to be a Complication of a Multitude of Veſicles with the ſanguineous Veſſels. And in this Opinion I thought my ſelf confirmed, by blowing into the *Aſpera Arteria* of Quadrupeds, when I had cut off Part of the exterior Membrane of one *Lobe* of the *Lungs*, and found the Lungs to riſe with unequal Protuberances, not unlike Bladders. But the following Experiment hath much ſhaken that Conjecture.

Mar. 2. $167\frac{1}{2}$, I made a Ligature about a Dog's Neck, and opening both the jugular Veins with a pretty large Orifice, I let him bleed to Death, to prevent being overcharged with coagulated Blood. Immediately I opened the *Thorax*, and tying the *Vena Cava*, with all the Paſſages from the left Ventricle of the Heart, or its *Auricula*, I cut the *Lungs* with the Heart and *Aſpera Arteria* entirely out. To the *Aſpera Arteria* I fitted a Syphon, and faſtened it with a ſtrong Binding of Packthread. This done, I blew up the *Lungs*, and fitting a Cork to the End of the Syphon, I hung them in a Chimney to dry. In a quarter of an Hour they ſubſided about a ſixth Part; whereupon I ordered a Perſon to watch them, and to blow them up as oft as they ſubſided: Which Courſe continued, they would not the next Morning ſubſide a fourth Part in three Hours. And (excepting 3 Quarters of an Inch Diſtance from the Circumference of the *Lobes*, where the Thinneſs of the Subſtance of the *Lungs* gave the external Heat the Advantage of a ſudden Paſſage, and quick Diſpatch of drying thoſe Parts leaſt furniſhed with Moiſture) I did not perceive, making a proportionable Allowance for the drying of the whole Subſtance of the Lungs, any conſiderable ſubſiding in two Days more. But upon the blowing in at the Syphon (whoſe Ligature I was now forced to renew) I could eaſily feel the Air to paſs through the external Membranes, both on the convex and concave Sides, towards the Extremity of the Circumference of the *Lobes*; but moſt abundantly on the concave Side.

Mar. 5. I carefully cut off one of the *Lobes*, and the inward Structure ſeemed like a Cane or dried Flag when tranſverſly cut; and upon blowing in at the Syphon, I fancied the Air to come equally out of all the Pores I had expoſed to View. Whereupon I fixed Spittle in ſeveral Places, and upon freſh blowing found Multitudes of Bubbles made in the denudated Parts of the *Lobe*. Immediately I made a deep tranſverſe Inciſion into that *Lobe*, and blowing in at the *Syphon*, I found the Air to come ſo freely out at the larger Ramifications of the *Bronchiæ*, that I could not give the *Lobe* a conſiderable Riſe with a ſtrong Blaſt: Yet upon ſtopping with my Fingers the larger Paſſages of the *Bronchiæ*, which I had cut, I found that *Lobe*, upon a freſh Blaſt, conſiderably to ariſe with unequal Protuberances (where the Inciſion was made) giving no ſmall Suſpicion of ſome latent Veſicles. Hereupon I tied that *Lobe* above the Inciſion, and taking off Part of the external Membrane of another *Lobe* (having firſt tied up all the reſt of the *Lobes*) I poured Water into the *Syphon*, and applied a ſtrong Blaſt, in hopes to have the Water come forth in Streams at all the Pores; but that did not ſatisfactorily ſucceed, it coming out in a confuſed Irroration of the external Surface, without any Ebullition, unleſs at the larger Ramification of the *Bronchiæ*. Then I tied up this ſecond *Lobe*, and untied a third, pouring in an Ounce of the *Oil* of *Turpentine*; at the *Syphon* I gave a ſmall Blaſt, and corked it up. Two Hours after I took off the ſmall Membrane of that *Lobe*, and upon a gentle Blaſt at the *Syphon* found an Ebullition of infinite little Bubbles.

March 10. (having continued it to the Chimney) I cut all their *Lobes* in Pieces by different and various irregular Inciſions; whence I could eaſily obſerve the ſeveral Ramifications of the aerial and ſanguineous Veſſels, with their Continuation to the Circumference of the *Lobes*, and a proportionable Diminution as they were at a further Diſtance from their Original.

Shall I hence conclude the Structure of the *Lungs* to be a Complication of a Multitude of the Ramifications of the *Bronchiæ* and ſanguineous Veſſels? And that the ſeeming Veſicles were occaſioned only by the Violence of the Blaſt, and the Drineſs of the extreme and ſmalleſt Paſſages of the aerial Veſſels; whereupon, thoſe neareſt to the *Bronchiæ* (being moiſter) were, more than their ordinary Proportion, extended, upon Hindrance of a free and uſual Paſſage to the Air in the leſſer Veſſels or their Extremities?

An Experiment concerning the Manner of Reſpiration; by Dr. Richard Lower, *n.* 29. *p.* 554.

IV. Pierce the Side of a Dog between the 6th and 7th Rib in the Middle of the *Thorax*, juſt over againſt the Region of the *Heart*, with a ſmall Inciſion Knife, paſſing the Knife but juſt into the Cavity of the Breaſt (which you may juſtly know by finding no Reſiſtance to the Point of it) then take it out, and put in a Director, or a ſmall Quill made like it, and thruſt it in about an Inch, directing the End of it toward the *Sternum*, cloſe to the Inſide of the Breaſt. Then cut upon it about an Inch on the *Intercoſtal* Muſcles; by which you may be ſecured from touching the *Lungs* with the Point or Edge of your Knife. This done, put in your Finger, and with your Nail ſeparate the *Nerve* which paſſeth along the Side of the *Pericardium* toward the *Diaphragme*. Then put in a Probe, a little inverted at the End like a Hook, and apprehend the *Nerve*, and pull it to the Orifice of the Breaſt, and cut it off, and ſow the Hole up very cloſe. Do the ſame on the other Side, and preſently let the Dog looſe, and you will plainly ſee him draw his Breath exactly like a Wind-broken Horſe.

The moſt obvious Obſervations from this Experiment are, 1. That the whole Manner of Reſpiration is quite altered. For as in a ſound Animal, in Inſpiration, the Belly ſwells by the lifting up the Bowels by the Contraction of the *Diaphragme*; and in Expiration the Belly falls by the relaxing of the ſame: In a Wind-broken Dog, or Horſe, 'tis quite contrary; for in them it is to be ſeen plainly, that when they draw their Breath their Belly is drawn in very lank and ſmall, and when they breath out, their Belly is relaxed, and ſwells again. 2. The Lungs not moving of themſelves at all, but all Inſpiration being made by the Dilatation of the *Thorax*, and that Dilatation being cauſed partly by the *Intercoſtal* Muſcles drawing up the Ribs, and partly at the ſame Time the *Diaphragme*, by its Contraction, drawing downward the lower ſmall Ribs to which it is joined, and alſo lifting up the *Viſcera* of the lower Belly, by which they do jointly make all the Space they can for the Air to come in and diſtend the *Lungs*, it muſt hence neceſſarily follow, that where one ceaſeth from its Work, the other, for the Exigence of Nature, muſt take more Pains to ſupply the other's Defect. So that the *Diaphragme* being made uſeleſs, by looſing its *Nerves*, the *Intercoſtal* Muſcles do dilate the Ribs much more than formerly, even to the utmoſt Diſtance they can, when there is need for it; as when you make the Dog run a little after he is cut, or when you gallop a Wind-broken Horſe, doth manifeſtly appear. 3. The Manner of Reſpiration being the ſame in a Dog, whoſe *Diaphragme Nerves* are cut, and in a Wind-broken Horſe, 'tis more than probable, that the Cauſe may be as nearly the ſame as the Signs are, and that (for the moſt Part, if not always) they have their Occaſion from the Relaxation or Rupture of the *Nerves* of the *Diaphragme* at firſt.

A Supply of freſh Air neceſſary to Life; by Dr. R. Hook, *n.* 28. *p.* 539.

V. I formerly tried an Experiment of keeping a Dog alive, after his *Thorax* was all diſplayed by the cutting away of the Ribs and *Diaphragme*; and after the *Pericardium* of the Heart alſo was taken off. But divers Perſons ſeeming to doubt of the Certainty of the Experiment, I cauſed it to be repeated at a Meeting of the *Royal Society* with the ſame Succeſs, the Dog being kept alive by the reciprocal blowing up of his Lungs with Bellows, and then ſuffered to ſubſide for the Space of an Hour or more, after his *Thorax* had been ſo diſplayed, and his *Aſpera Arteria* cut off juſt below the *Epiglottis*, and bound on upon the Noſe of the Bellows.

The Dog having been thus kept alive above an Hour (in which Time the Trial was often repeated, in ſuffering the Dog to fall into convulſive Motions, by ceaſing to blow the Bellows, and permitting the *Lungs* to ſubſide and lie ſtill, and of a ſudden reviving him again by renewing the Blaſt, and conſequently the Motion of the *Lungs*) I cauſed another Pair of Bellows to be immediately joined to the firſt, by a Contrivance I had prepared, and pricking all the outer Coat of the *Lungs* with the ſlender Point of a very ſharp Pen-knife, this ſecond Pair of Bellows was moved very quick, whereby the firſt Pair was always kept full, and always blowing into the *Lungs*; by which means the *Lungs* alſo were always kept very full, and without any Motion, there being a continual Blaſt of Air forced into the *Lungs* by the firſt Pair of Bellows, ſupplying it as faſt as it could find its Way quite through the Coat of the *Lungs*, by the ſmall Holes pricked in it, as was ſaid before. This being continued for a pretty while, the Dog, as I expected, lay ſtill, as before, his Eyes being all the Time very quick, and his *Heart* beating very regularly: But upon ceaſing this Blaſt, and ſuffering the *Lungs* to fall and lie ſtill, the Dog would immediately fall into dying convulſive Fits; but he as ſoon revived again by the renewing the Fulneſs of his *Lungs* with the conſtant Blaſt of freſh Air. Towards the latter End of this Experiment a Piece of the *Lungs* was cut quite off; where it was obſervable, that the Blood did freely circulate, and paſs through the *Lungs*, not only when the *Lungs* were kept thus conſtantly extended; but alſo when they were ſuffered to ſubſide and lie ſtill. Which ſeem to be

Arguments, that as the bare Motion of the *Lungs*, without freſh Air, contributes nothing to the Life of the Animal, he being found to ſurvive as well when they were not moved as when they were; ſo it was not the Subſiding or Moveleſſneſs of the *Lungs* that was the immediate Cauſe of Death, or the Stopping of the Circulation of the Blood through the *Lungs*, but the Want of a ſufficient Supply of freſh Air.

The chief Uſe of Reſpiration; by Dr. Will. Muſgrave. *n.* 240. *p.* 178.

VI. Dr. *Thruſton* aſſerts the chief Uſe of *Reſpiration* to conſiſt in maintaining a due Motion of the Blood; but the Arguments he produces to make out his Aſſertion ſeeming to me inſufficient, I pitched upon the following Experiment, which I hope will be deciſive of that Matter.

I took a large, middle-aged, healthy Dog, and, having freed the *Trachea* from the adjacent Parts, cut it off juſt beneath the *Pomum Adami*, and turned the looſe End outward. After ſome Time allowed him to recover the preſent Concern, with a Cork, got ready on Purpoſe, I ſtopped up the *Trachea*, binding it cloſe to the Stopple. Some few, but violent Struggles ſucceeded, in which the *Sternum* was raiſed, as in the deepeſt Inſpiration; and thus he died. From the Stoppage of his Breath, to the laſt Motion I could diſcern in any Part of his Body, was, from a Watch, obſerved to be the Space of two Minutes. I then immediately threw open the *Thorax*; where I ſaw the Blood ſtagnating in the *Lungs*; the *Arteria Pulmonaris*, the right *Ventricle* of the *Heart*, with its appending *Auricle*, and the two great Trunks of the *Cava*, diſtended with Blood, to a Degree exceſſive; the *Vena Pulmonaris*, left *Auricle* and *Ventricle* of the *Heart*, in a Manner empty; not containing (as near as I can gueſs) more than one Spoonful of Blood.

This Experiment proves, That *Reſpiration* promotes the Paſſage of the Blood through the *Lungs*; and in Bodies full of vigorous Blood, it is, on this Account, of perpetual Neceſſity. This Acceleration of the Blood in that Paſſage, ſeems to be the principal Uſe of *Reſpiration*; no other is of ſuch Conſequence to Life, or ſtands in Competition with it.

A Polypus of the Lungs; by Mr. Robert Clark. *n.* 235. *p.* 779. *Fig.* 8.

VII. A poor Man (a Taylor by Trade) has been ill by Times theſe 4 Years, but for 3 Years laſt paſt, has frequently coughed up ſomething of the Similitude expreſſed in the *Figure*. He coughs them up after a continued Coughing of almoſt half a Day or Night, and knows when they come, at the firſt feeling great Pains round his Cheſt; he has voided Hundreds of them, and all alike, though ſome are a great deal bigger, and many leſs than the Deſcription. They do not ſeem, he ſaith, to have Life; but he has preſſed a Slimineſs out of the Body, and ſo through that Part which ſeems to be the Head. This had a great many more Fibrils, towards the latter End than I expreſſed, and ſeemed to be very Nervous. He is now very Meager, and complains of great Pains about his Cheſt and back Part anſwerable to it.

By Dr. Lyſter. *ib. p.* 780.

2. Theſe are figured in the remoter and deeper Branches of the *Aſpera Arteria*; and therefore ſo difficult to get up. They are nothing elſe but the viſcous Excretions of the ſmall Glands, hard baked in thoſe Molds, whoſe Form they receive; and may, if we ſtrain a Metaphor, be called *Polypus's* of the *Lungs*.

3. A

A Polypus of the Lungs; by M. Buſſiere. *n.* 263. *p.* 545.

3. A Boy of 5 Years old died at *Kenſington* of a *Conſumption*. A Year before he died he was troubled with a dry Cough, which continued ever ſince, ſpitting now and then a little Quantity of Blood; 10 or 12 Days before he died, his Nurſe took Notice of ſome thick Skin, as ſhe ſaid, he ſpit out. His Phyſician having examined one of them, found it had the Conſiſtence and Shape of a Veſſel, which made him think it might perhaps be ſome Veſſel of the *Lungs*. The Child being dead, I opened the Body, and found the *Omentum* quite deſtitute of Fat; ſo were likewiſe all the Parts of the Body; the Glandules of the *Meſenterium* were hardned and blackiſh. In the left Side of the Lungs I found a little purulent *Sanies*: The Inſide of the *Trachea Arteria* was incruſtated with a ſlimy Membrane, which I took off from the *Trachea* and the Branches in the *Lungs*, inſomuch that that *Pellicula* made a perfect Veſſel from the *Larynx* to the very Extremities of the *Bronchies*, of which it came off very eaſily without breaking either the Trunk or the Branches, juſt as you ſee it in the *Figure*: It adhered to the inward Coat of the *Trachea* only by ſome ſmall Filaments, which were ſo tender that they broke off eaſily, which made me think the Production of that extraordinary Veſſel was nothing but the mucilaginous Humour, which is continually diſcharged by the Glandules of the *Trachea*, which being grown more clammy by the Diſtemper, was reduced to a Kind of Jelly by the Drineſs of the Air, which Drineſs not permitting the Spitting it out, incruſtated the Inſide of the *Trachea* and *Bronchies*, and growing thicker, was at laſt ſhaven off, by the violent Fit of Coughing the Child was ſometimes taken with, and then was renewed again by the ſucceeding *Mucus*. This new Veſſel would not diſſolve in hot Water: The Veſſels of the *Lungs*, that is, the *Trachea* and *Bronchies*, the *Pulmonary* Arteries and Veins were as whole as could be.

Fig. 9.

This I hope will undeceive thoſe who believe that ſome Men ſometimes ſpit out the *Blood-Veſſels* of their *Lungs*.

The Motion of the Heart; by M. Templer. *n.* 93. *p.* 616.

VIII. I cut out the Hearts of two *Urchines*, and found the *Syſtole* and *Diaſtole* to continue full two Hours, while the Hearts lay upon a glaſed, earthen white Plate in a cold Window. The Diſtance of their *Diaſtoles* was unequal in Time, but very large for half an Hour, and then ſenſibly diminiſhing until they ceaſed at the two Hours Diſtance; and would not then be reinforced by a Needle's Point, which for the Half Hour preceding they would anſwer at any Time. After they had ceaſed above $\frac{1}{4}$ of an Hour, ſo as a Needle pricking them cauſed no Motion; yet upon ſetting the Plate upon the Hearth in the Chimney, in about two Minutes of Time they began to beat, though but weakly; and upon eight Minutes Continuance they beat freely; and when removed into the Window again, continued their Pulſation, without pricking, above an Hour, and might have done longer, could I have ſpared my Servant to attend them longer. Peradventure we may hence conjecture at the Cauſe of *Life* and *Death*: But when ſhall we ſay any Animal or Inſect is *dead*, if it hath Motion?

A ſtrange Pericardium; by M. de Mortel. *n.* 58. *p.* 1184.

IX. 1. We lately met with a Body, which being opened, the Liquor which is contained in the *Pericardium*, or the Bag of the Heart, was found congealed into a Conſiſtence fit to be cut with a Knife, and two ſquare Fingers thick about the Heart.

A Glanduloſe Subſtance found between the Heart and Pericardium of an Ox; by ——— *n.* 67. *p.* 860.

2. In *Octob.* 1684, a preternatural *Lump of Fleſh* was taken out of an Ox at *Oxford*. The Weight of the whole Subſtance, cleared from the little Fat, &c. adjoining to it, amounted to 19¾ ℔. It very much reſembled a *Heart*; but it was ſomething flatter, and each of the flat Sides made an equilateral Triangle. The *Baſis* of this *Cone* of Fleſh was 2 Foot 7 Inches in Circumference, and a Thread drawn round it Length-ways from the *Baſis* to the *Vertex*, came to 2 Foot 9 Inches.

When we had divided it, cutting from the *Vertex* to the *Baſis* of the *Cone*, and paſſing through both the *Ventricles*, and *Mucro* of the *Heart*, we found the Heart not to exceed the natural Size: That which was extraordinary about it, being a large *Glanduloſe Subſtance* compaſſing the *Heart* (unleſs where the Veſſels had their Paſſage) and ſtretching the *Pericardium* to the Exceſs before-mentioned. We ſaw no Liquor in the *Pericardium*, nor indeed was there Room for any; this *Glanduloſe Subſtance* taking up all the Space between the *Heart* and *Pericardium*, to both which it grew very faſt. It was thickeſt about the *Baſis* of the *Heart*, where it covered the *Auriculæ*, and was 3½ Inches thick: It grew thinner on both Sides gradually toward the *Mucro*, where it was 1½ Inch thick. In the *Septum Cordis* a gritty *Sabuloſe* Subſtance was found, half as big again as a Walnut. In the Lungs were ſeveral *Cyſtides*, containing Matter more or leſs fluid: One very large *Cyſtis* held ſome Ounces of a Matter not unlike that of a *Steatoma*.

The Butcher who killed this Ox ſays, the *Lungs* grew faſt to the *Pleura* on both Sides; which he affirms not to have found once in 40 Times in the Cattle killed by him. He ſays alſo, that the Ox, though not over-burthened with Fat, complained much in Travelling; which is eaſy to account for, there being not Room for the *Heart* to be diſtended, as it ought, in its *Diaſtole*.

A Polypus in the Heart; by *Mr.* W. Gould. *n.* 157. *p.* 537.

X. A poor labouring Man died ſuddenly at *Oxford* in the Street. The Vulgar, which alone converſed with him in his Illneſs, give this Account of him: That he was of a ſwarthy lurid Complexion: He was afflicted with Fits of the Falling-ſickneſs: An obſtinate Quartan Ague of above a Year's Continuance: A deep Jaundice, even to that Degree, which is called the Black, with its conſtant Conſequent, an univerſal ſettled ill Habit of Body: A Senſe of a hard Load and Preſſure at his Stomach (meaning perhaps his Breaſt, or the upper Part of the Region of the Liver.) He complained much of a very great Shortneſs of Breath, being almoſt conſtantly apprehenſive of Choaking; far fetched involuntary Sighings, and prodigious Palpitations of his Heart continually afflicted him: He uſed to ſwoon very often; and at length died, according to the Judgment of the By-ſtanders, in the ſhivering Fit of his Ague, with the Convulſions of an Epilepſy, not without Foaming and Frothing at his Mouth.

When we opened him, the *Liver* upon deep Inciſions appeared Bloodleſs, ſtuffed throughout like a Bag of Sand with a yellow, gritty Subſtance: The *Gall-bladder* alſo was furniſhed with the like, but of a darker Hue: The *Spleen* was very large, and of too ſoft and looſe a Texture, not much diſcoloured: The *Omentum* rotten and waſted: The *Membrane* of the *Stomach* extreamly flaccid and very thin, appearing black and mortified, and upon taking it out within 24 Hours after Death (though tied at both Ends very cloſe) ſent forth ſuch an intolerable ſour, rancid Scent, that the ſtrongeſt double *Aquafortis* (to which it might be beſt compared) could not prove ſo troubleſome and offenſive to the Smell: The *Lungs* were diſtended to the uttermoſt with a purulent Froth: The *Heart* much ſtretched beyond its natural Magnitude, and of a very flat Figure: The *Veins* of the whole Body were of an unuſual and extraordinary Bigneſs, eſpecially the internal *Jugulars* were ſtrained to above ¾ Inch Diameter; *Polypus Concretions* alſo were found in the larger *Veins* of the Arms, Legs, and other Parts, but that was moſt remarkable which we found in the right *Ventricle* of the *Heart*, and towards its Apex or Tip firmly radicated, ſo that no ſmall Streſs was required for the Separation. The Part A, by which it was fixed, was nigh an Inch and half Diameter when freſh taken out, irregularly rough at the Bottom, inſinuating many Roots into the *Lacunæ* or little Cavities of the *Ventricle*, which again by leſſer Fibres were faſtened to the inner Membrane of the *Heart*. The great Branch B, which ran out into the right *Auricle* was nigh two Inches Diameter at the largeſt Extreme, and reached no farther than the Inſertion of the *Vena Cava*. As for thoſe Branches marked G G, tending to the Arms, how far they grew I cannot aſſert, not knowing whether they were broke off or no, but the Branches H H H H, *&c.* tending towards the Head (I well remember) could not be drawn out without ſome Force, and it is very likely they were broke off at the *Diverticula*, or two round *Sinus's* where the *Jugulars* enter the *Scull*; for the like Concretions were found in the Veſſels of the *Brain* to which probably theſe might be adjoined. The Subſtance of the whole was plainly Fibrous, reſembling a Nerve, and tough while moiſt (though upon drying, brittle) the Colour white, and was cloathed with a thin Coat, including (in that Part which filled the right *Jugular Vein*) two little black Specks *b b*, of Blood (as we ſuppoſe) a long while there coagulated.

Fig. 10.

The Cauſe and Nature of a Polypus.

It is a Queſtion much debated by Phyſicians, Whether a *Polypus* is produced ſome conſiderable Time before, or always immediately after Death?

Thoſe that contend for their ſudden Generation after Death, among other Reaſons of leſs Moment, inſiſt much on the Argument drawn from the tough Skin ſpreading itſelf in a ſhort Time, on Blood let out for the Cure of *Pleuriſies*, *Peripneumonies*, *Rheumatiſms*, violent *Head-achs*, and in Caſes of any inward Inflammations; and it ſeems a good Conſequence that the ſame Coldneſs and Want of Motion after Death may as eaſily make the ſame Product in the Veſſels; and it is to be confeſſed, that ſuch like Concretions have been diſcovered in *pleuritical* Bodies diſſected. But on the other Side it may be urged, that this Appearance is not conſtant in all Diſſections of Bodies ſo affected, and that very frequently nothing like it has occurred; from whence we have Reaſon to conjecture, the outward Contact of the Air preſſing the Surface of the emitted Blood, or ſome other external Cauſe, may have an Intereſt in forming that Skin; for elſe why ſhould not the like Concretion proceed conſtantly in the Blood-Veſſels, whence Air is excluded, as well as when the Blood is expoſed in a Porringer. Beſides, we find that theſe *pituitous* Bodies ſcarce ever offer themſelves in Diſſection of *pleuritical* Perſons, but where the *Pleuriſy* was complicated with ſome other long ſettled Indiſpoſition; ſo that the Time of their Growth cannot be certainly collected from ſuch Inſtances: Beſides, when they do chance to appear in a ſingle *Pleuriſy*, they float looſe in the Maſs of Blood without fixing to any Part, are of a very lax Texture, without any diſtinguiſhable Fibres, and like what covers *pleuritical* Blood in a Porringer, do rather reſemble a ſtiffer Sort of Jelly, or Size almoſt dried, than any thing of a tough and fibrous Conſiſtence, ſuch as is obſerved in a *Polypus*.

Anat. Obſ. 73. *Kerkringius* aſſerts it in his own Power to make ſuch Concretions at Pleaſure by the known Experiment of injecting Spirit of Vitriol into a Dog's Veins, and obſerving the quick Coagulation ſo made, infers that ſome peccant Acid in the Blood, occaſioned by a Diſeaſe, may as ſuddenly produce the ſame when Life is gone. To this it may be anſwered, that this artificial *Polypus* is only a kind of grumous and ſtrongly concreted Blood, wholly different as to Colour, Texture and Firmneſs, from that Subſtance we here diſcourſe of. But however, if *Kerkringius* was ſo lucky as to produce one exactly like a true *Polypus* in all Circumſtances, though it gives indeed ſome Light into the Nature of their Cauſe, yet it does not follow that this Cauſe muſt always work its Effect in an Inſtant, but a longer or ſhorter Time will be required as the Cauſe is more or leſs active. In the mean Time I do not deny, that ſtrange Coagulations have ſuddenly happened, and Anatomy has often made ſuch Diſcoveries in Caſes of ſudden Death; yet even theſe generally are not to be looked on as Products after Death, but rather the quick inevitable Meſſengers and immediate Forerunners of it: Such are thoſe Concretions that, upon Diſſection, have been found in the Heart and Blood-Veſſels of Perſons killed by ſudden Frights; as alſo in thoſe that have been quickly diſpatched by an unexpected Fit of an *Apoplexy*, a *Cardiacal Syncope*, or a ſuffocating *Catarrh*, where the coagulative Spirit, like Lightning, ſtrikes through the whole Maſs of Blood, and either fixes it and makes it unapt for the Generation of freſh Spirits, or elſe (if a groſs Similitude may illuſtrate ſo abſtruſe a Matter) like what happens to the inviſible Steams of Spirit of *Salt Armoniac*, (which will be condenſed, grow turbid and viſible, at the Approach of the Vapour of Spirit of *Salt* or *Nitre*) the animal Spirits themſelves are clouded, altered from their Natures, extinguiſhed, and quite deſtroyed, by a Mixture of the foreign preternatural *Halitus*. 'Tis not improbable, that by one or both of theſe Methods the peſtilential Effluvia of an infected Air, the *Arſenical* Exhalation of a Damp, and the *Nitro-ſulphureous* Steam (much like the Scent of *Spirit* of *Nitre*) ariſing from burning Charcoal, do often act ſuch ſudden and fatal

Tragedies: For if we reflect on the membranous Subſtance of the *Lungs*, the infinite Number of Veſicles they are compoſed of, how that in every aſſignable Point theſe Veſicles are adorned with Capillary Blood-Veſſels, ſo that the Point of a Needle every where draws Blood; if we calculate the inward concave Superficies of the *Lungs*, ſuppoſed unfolded and ſpread out into a Plain, which muſt needs exceed the outward apparent Convex above an hundred times, and conſequently conſider the vaſt Surface of Blood each Moment expoſed to the Air: Laſtly, if we allow the Ingreſs of the Air into the Blood upon Breathing, which ſcarce any now deny; I ſay, if we reflect on theſe Things, it is eaſy to imagine how ſuddenly miſchievous any coagulated poiſonous Steam may prove, ſince, together with the Air, it will be diffuſed through all the Blood contained in the *Lungs* at the very Inſtant of Inſpiration, and (whether it be auſtere or acid, or both, or what other Name Phyſicians may pleaſe to give it) joins itſelf *per minima* with almoſt each Particle of Blood, and preſently deſtroys all Fluidity, ſtuffs the *Lungs* and *Heart* with an immoveable, and almoſt mortified Maſs; puts a final Stop to the Circulation, and ſo in a Moment breaks off the Series and Thread of Life. The Concretions that have ſuch ſurpriſing Events, we muſt allow to be ſuddenly produced, and we may aſcribe all, perhaps, to the exceeding Briſkneſs and Activity of the Acid, or what other Quality gave their Origin; but nevertheleſs in the Caſe of lingring Diſeaſes, I think it will be no hard Matter to prove (not to contend that they differ from thoſe already mentioned) that at leaſt they make a ſlower Progreſs in their Growth, as proceeding from a leſs active Cauſe, and conſidering the Nature and Conſiſtence of the Bodies themſelves, the Diſeaſes and Symptoms that uſually accompany them, and the Circumſtances of thoſe Diſſections that have diſcovered them, they muſt needs appear a Work of Time, and by a daily Appoſition of new Parts, ſwell into that ſtrange Bulk and Shape they ſometimes obtain.

What Conſiſtence theſe Bodies ſometimes acquire, this above deſcribed is a very inſtructive Inſtance. The cloſe fibrous Texture, the tough Membrane that covered it, and the two black hard Specks therein included, its ſtrong Adheſion to the *Heart* by little capillary Roots, and other larger Protuberances adapted to all the little Cavities of the *Ventricle*, are Arguments that it was no ſmall Time in growing: And if it happened after Death, how came it to paſs that the large Branch *B*, ſhould ſtop within the *Auricle*, and that nothing of the like Subſtance ſhould be continued farther into the *Vena Cava*, ſince the Blood there muſt needs be as much diſpoſed to ſuch a ſudden Coagulation as in the *Heart*? Laſtly, if to theſe Remarks, we add the Inſtance *Malpighius* gives of a *Polypus* made hollow by the Current of the Blood, like another new Blood Veſſel framed within the natural one: If alſo we add another round one *Borellus* ſpeaks of, bigger than a Man's Fiſt, found in the *Aorta* near the *Heart*, conſiſting of a great many Membranes lying unconnext one upon another, like the Leaves of a Cabbage (a Product, without doubt, of no ſmall Time) we need go no further than the bare Accidents of theſe odd Bodies themſelves to prove their long

Continuance before Death. And the preſent Subject ſo demonſtrates the Thing, as to leave no place for Doubt: For here we have the *Jugular Veins* (whoſe Coat could not have been much ſtretched on a ſudden, even by the Wind of a Smith's Bellows) in Tract of Time, enlarged only by the gentle aſſiduous Preſſings of the Blood, to thrice their former Diameter, that is, nine times their natural Cavity. Here we have a *Heart* (the ſtrongeſt and firmeſt Muſcle of the Body) by Degrees formed into a Shape quite different from the natural; the right *Auricle* and *Ventricle*, notwithſtanding the Strength of the Fibres of the latter, and their Indiſpoſedneſs to ſtretch eaſily, ſo prodigiouſly diſtended, that no outward Force whatever, without breaking it, could effect the like: Such hard Shift did Nature make to continue the vital Stream, and avoid the fatal Stop, each Moment threatned by the *Polypus*, that with double Force ſhe was obliged to maintain a Pulſe; which (becauſe it could not break or expel the unnatural Load) did by little and little ſtretch the Sides of the *Ventricle*, for the more eaſy Paſſage of the Blood, and by terrible Palpitations for a long Time protract a miſerable Life, till the monſtrous Body growing too big, the weakened Fibres could ſtretch no more, nor yet regularly contract themſelves any longer; ſo that the *Heart* at laſt, juſt ready to ſink under the Burden, is forced to collect its little remaining Strength into one briſk Effort, and aſſiſted by all the Spirits of the Body, cauſed the poor Wretch to expire in an univerſal *Convulſion*.

The Diſeaſes wherein almoſt always *Polypi* may be expected, are the *Apoplexy*, *Phrenſy*, *Falling-Sickneſs*, *Convulſions*, *Aſthma* (or difficult Breathing) *Conſumption*, ill-cured *Pleuriſies*, ill-cured and lingring *Fevers*, *Plague*, *Venereal* Diſeaſes, *Pleuriſies*, *Peripneumonies*, *Green-Sickneſs*, *Varices* of the *Veins*, and inveterate *Head-achs*, &c. The Part moſt uſually affected is the right *Ventricle* of the *Heart*, and the *Genus Venoſum*, where the Blood returning from the Habit of the Body, ſlow in Motion, impoveriſhed and diſpirited, more eaſily admits ſuch a Concretion; yet the left *Ventricle*, and the *Genus Arterioſum*, frequently breed the like: Such was that *Tulpius* mentions branching out into the *Aorta* and *Vena Pulmonaris*, in a Perſon who died of a grievous *Apoplexy*; and ſuch *Wepfer* makes one great Cauſe of *Apoplexies*. The *Sinus's* of the *Brain* alſo often harbour 'them, as we have found in one that had an obſtinate *Head-ach*, and at laſt died *mad*; and not long ſince in another, who once had ſome Fits of a *Frenzy*, and at length died *epileptical*; in both which Caſes the *Sinus Longitudinalis* was full of a *Polypus*, which emitted very tough Branches into all the little lateral Veſſels; and *Blaſius* gives the like Account in a *Mad-man*'s *Brain*, who at laſt died *convulſed*. Upon the Streſs of theſe, and many other Obſervations of this Nature, it is reaſonable to aſſert, that a *Polypus* is ſo far from being a Product at the Period of a Diſeaſe, that it ſeems rather a ſtated ſettled Cauſe, as well as an immediate Occaſion of the fatal Symptoms which attend the moſt incurable Diſtempers: Thus if in the *Heart* it grows ſo large as to force a *Diaſtole* beyond the due Tenſion of the Fibres, it produces a mortal *Syncope*; if ſmaller, and not exceeding the Confines of the *Ventricles*, a ſtrong and irregular Pulſe ſucceeds, and there muſt be a *Palpitation* of the *Heart* to maintain

Life. If it ſends Branches into the larger *pulmonary* Veſſels, the Motion of the Blood is retarded, and the *Breaſt* and *Lungs* labour under their Load in an *Aſthma:* Or if it reaches the Capillaries, a *Peripneumony*, an *Ulcer*, and at laſt a *Conſumption* is at Hand. If the Concretion begins in the ſmall Veſſels of the *Pleura*, then a *Pleuriſy* follows; if it grows and fixes in the larger Veſſels of the Arms, Legs, or the like, painful *Varices* appear; and probably *Rheumatiſms* owe much of their Pain to ſome ſuch Concretions begun in the capillary Veſſels of the Habit of the Body. Again, when theſe Bodies are in the *Sinus* of the *Brain*, if ſmall, the Veſſels will only be a little diſtended, and ſo a Pain in the Head may ſuffice; but if larger, the Obſtruction increaſes, the Blood and Spirits are caſt into a Hurry, the *Brain* is inflamed, the Senſes preſently are diſordered in the Apprehenſion of their Objects and ſo a *Frenzy* ſeizes the Man; if they chance to be yet bigger, and fill the *Sinus* more, the Blood pent up moves more furiouſly, and ſo deſtroys Senſe and all voluntary Functions; then the Tumult extends beyond the Limits of the *Brain* through the whole Syſtem of the Spirits; and whereas in a *Frenzy*, Senſe, though miſtaken, did direct their Paths, now they run *qua data Porta*, ungoverned and impetuous through the Nerves and Muſcles, cauſing the involuntary Motions and *Convulſions* of an *Epilepſy*, which continue till the Spirits are ſpent, the Blood quiet, and the Blood-veſſels, by the very Agony, enlarged equal to their Burden; and indeed, in *Epilepſies*, Diſſections ſeldom miſs of a *Polypus*, neither can we deny this *convulſive* Power of a Concretion in the *Brain*, ſince the great *Lower*'s Experiment tells us, That a Dog died in terrible *Convulſions* by injected Milk coagulated only in his *Heart:* But laſtly, if the *Sinus* prove almoſt totally obſtructed, the Blood inſtantly overflows the *Brain*, and without much previous Notice (except perhaps of Giddineſs, Loſs of Sight, or the like) an *Apoplexy* inſues; which Diſeaſe will alſo more dangerouſly happen, when ſome Particles of a *Polypus* in the left *Ventricle* of the *Heart*, broken off by the violent Stream of Blood, ſhall be impacted into the *carotid Arteries* at their Inſertion into the *Brain*, whence all Intercourſe of Spirits will irrecoverably be ſtopt. Now though in ſome of theſe Caſes a *Polypus* does only by Fits diſquiet the Man it poſſeſſes, yet it is in Being when it does not produce ſuch ſenſible Effects; for Exerciſe, Paſſions, Diet, and other external Cauſes, will ſo affect the Quantity and Motion of the Blood, that the Obſtruction may be more inſupportable than when the Stream was calm: And it is as eaſy to imagine the Diſorders thus cauſed in an Animal Body, as that a large ſwift River, dammed up from quietly purſuing its own Channel, muſt needs impetuouſly overflow all the Country about.

And thus we have conſidered thoſe Symptoms of which a *Polypus* may be rationally thought (at leaſt occaſionally) the next and immediate Cauſe: As for others before-mentioned, namely the *Plague*, *Venereal Diſeaſes*, *Lingering Fevers*, and the like, they are not the Effects of a *Polypus*, but Cauſes, that diſpoſe the Blood of ſome Perſons to ſuch *pituitous* Concretions.

But to diſcover their Cauſe more nicely, we may obſerve with *Wepfer*, that Perſons thus afflicted are never well, breath hardly, have frequent *Pal-*

pitations of the *Heart*, unequal Pulſes, are dull to all Action, ſtupid, luxurious and ſlothful; of a livid, leaden, or ſallow Complexion, or a ſaturated Red in Hands and Face, becauſe there is either very little Blood in the Capillaries of their Skin, or at beſt a ſlow Circulation: Their Blood has uſually a Thickneſs, and peculiar *Lentor* in it, or abundance of *Serum*; the latter for want of volatile Salt to digeſt the *Chyle* into a laudable Red, and the former happens, either becauſe the *Heart*, deſtitute of Spirits for its Pulſe, cannot duly agitate the Maſs, or (as Experiments on Blood emitted ſeem to prove) by reaſon of the Mixture of a preternatural Acid; whence may infer this conjunct Cauſe of a *Polypus*, that the Fibres of the Blood, not being ſufficiently ſuſtained and kept aſunder by a due Motion of the intercepted fluid Parts, may either barely upon the Account of Reſt cling together, or elſe may be by Degrees connected by an auſtere aſtringent Acid (always to be found in *cachectical* Bodies) for the ſame Reaſon as (an analogous Liquor) Milk is curdled, only with this Difference, that in this, the Coagulation is brittle, becauſe the Fibres are weak and ſhort, whereas it may be very tough in Blood, becauſe its Fibres are ſtrong, and of a greater Length.

Upon the whole we may conclude, That whatever maintains the Fluidity, Motion, Spirit, and Texture of the Blood, promiſes a Cure, though not of a confirmed *Polypus*, yet of the firſt Rudiments of it. All theſe Indications are anſwered by Medicines of volatile, briſk, active Parts, which deſtroy Acids, exalt and ferment the Blood, and not only hinder, but alſo diſſolve the firſt Beginnings of Coagulation; and probably, it is by affecting the Blood, and not immediately the *Nerves*, that they do ſuch Feats in Diſeaſes before-mentioned. Laſtly, The Effects of Bleeding in ſome Caſes can never enough be admired: Thus *Riverius* tells us of a Girl, 12 Years old, being bled plentifully for a *Pleuriſy*, was cured of her *Falling-Sickneſs*, a Diſeaſe never without the Suſpicion of a *Polypus*.

Explication of the Figure. *Fig.* 10.

Figure 10, repreſents the *Polypus*, as it appeared when freſh expanded on a Board. *A*, That Part which was firmly rooted in the right *Ventricle* of the *Heart*; B, the Branch terminated in the right *Auricle*; *C D D D*, the Part tending towards the *Lungs*; *E E*, the Branch running out of the *Ventricle* into the *pulmonary Artery*; *e e e e e*, the ſeveral leſſer Ramifications diſtributed according to the ſeveral Diviſions of the *pulmonary Artery*; *F F F*, the Branch belonging to the deſcending *Vena Cava*; *G G*, the Branches begun in the *Axillary Veins*; *H H H H H*, the two Branches that run up the *internal Jugulars* even to their Entrance into the *Scull*; *h h*, two little black Specks of concreted Blood contained within the Coat of the *Polypus*.

A great Quantity of Liquor found in the Thorax; *by Dr.* Natt. Fairfax, *n.* 29. *p.* 546.

XI. A Maid of *Rumborough* in *Suffolk*, when ſhe was about 13 Years of Age, took *Chalybeats* for the *Green-ſickneſs*, and found ſome Relief by it, but was after, much ſpent in her Wind. From 16 to 22, ſhe much afflicted herſelf with Grief, during which Time ſhe had every Year an acute Diſeaſe or two. At 18 ſhe was very weakly, clogged in her Cheſt, and melancholy. If ſhe went out in a windy Day, the Wind, ſhe ſaid, was ready to choak her. She was a very ſlow Walker, going up Hill or up Stairs with much Difficulty. She was now obſerved to be very thirſty, uſually drinking at Bed-time, and in the Night too ſometimes, elſe ſhe ſaid ſhe ſhould be choaked with Drought. Between 21 and 22 Years of her Age, going down Stairs, ſhe heard a frightful *Jolking* in her Breaſt. She took ſeveral things of Dr. *Brown*, and others at *Norwich*, for about 6 Months Time, without finding Relief. Half a Year after, towards *Michaelmaſs*, upon taking a ſlight Cold, ſhe was ſo ſtopped up that ſhe could only whiſper; nor could ſhe lie flat, but was reared up with Pillows. I preſently cauſed a *Vein* to be opened, and within leſs than an Hour ſhe got Breath, and ſoon after grew as well as ſhe was before. She affirmed, ſhe never Sweat in her Life, nor could it be procured by ordinary *Sudorificks*. Being deſirous to add an emperical Remedy, I gave her 3 of *Matthews*'s Pills, which did ſweat her lightly, but beyond whatever ſhe remembred. Several daily Doſes of *Lockyer*'s Pills, 4 *per Doſe*, removed the *Jolking*, as ſhe ſaid, lower to the *Midriff*; when ſhe, fearing an *Hyper-catharſis*, laid them by for 2 or 3 Days, and then taking them up again, could find no further Alteration by them. She could never lie on her left Side. In the 23d Year of her Age, in Winter, ſhe had a dangerous *Fever*, with a *Diarrhœa*, but came off. In her 24th, in Winter again, ſhe got Cold, was quite ſtopped up, after 5 or 6 Days fell into a *Convulſion* before ſhe was bled. By Bleeding, though too late, ſhe had preſent Eaſe, and cheared up in the Evening, but died the next Morning.

When I had laid open the hollow of the *Thorax*, there ſteamed out a very offenſive Smell, notwithſtanding the ſharp Froſt at that Time. The whole Cavity was empty above (as the Body lay ſupine) and beneath, all the right Side, and about $\frac{1}{3}$ of the Left, was filled with a Liquor, which took up in the Part to the Neckward a Hand-breadth, and ran 3 Fingers Thickneſs to the Left of the *Mediaſtinum*. The Liquor was like Cream, or rather like a Size of *Spaniſh-white*, having a Caſt of Yellow like Beeſtings; for putting a Spoon into it, from the Bottom I took up a thick clammy Matter, juſt like that *Spaniſh-white* that ſinks to the Bottom of its Size. In Quantity it might be about 3 Pints, contained in a Bag which was capable to hold as much more and better. The Bag ran along the left Shoulder, to the utmoſt of the right Side of the *Midriff*; not ſtreight along, nor ſtifly ſtretched, but about a Hand-breadth from its Riſe it went directly down to the *Midriff*, with which it cloſed all along. Its Skin or Coat was thicker than that of the Stomach, as well as its Capacity larger, inaſmuch as the Flexures of the Ribs joined with it, and made up above half the Compaſs. Where it adhered to the *Midriff*, it was near a Finger thick: And in one Place, where I endeavoured to ſeparate it from the *Midriff*, I hit upon a thinner Bag, whence iſſued 2 or 3 Spoonfuls of ſheer Water. The *Mediaſtinum* was either wholly waſted, or elſe woven into the Thickneſs of the Bag, as was alſo the *Pleura*, as far as the Bag reached. It lay looſe and flapping from the left *Axillar* to the Cheſt, having been before filled and diſtended either with Wind or the Liquor. All the Hollow was bedabbled with the Wallowing of the Liquor about, as is the *Ouſe* by the Ebbings and Flowings of the Tide in a Channel. That *Lobe* of the *Lungs* which ſhould have been on the right Side was gone, and that on the left, waſted to near a third Part. In the lower Belly all was well.

The *Jolking* was exactly like that of Water or Milk. This Woman was as flat-breaſted as a Man. It is probable, that the Liquor proceeded from the falling down of the *Chyle* from the *Axillars*.

An Hydrops Pectoris; *by Mr.* Sam. Doudy. *n.* 224. *p.* 390.

XII. A Noble Peer, many Years ago, was troubled with an extraordinary Shortneſs of Breath; his Lordſhip was always better in Bed, or lying, than ſitting or ſtanding, quite contrary to other *Aſthma's*, in which the afflicted, in Fits, are not able to lie down, the Muſcles of the Breaſt having a freer Motion when in an erect Poſture. Upon opening the Body, both the Cavities of the Breaſt were found full of Water, which when ſtanding or ſitting, preſſed ſo upon the *Diaphragme* that Reſpiration was performed with Difficulty, but when lying, that floating Load was ſo diſpoſed, that that Office of Nature was better performed. This ſeems to be ſo natural a Symptom, that it may be almoſt an infallible *Diagnoſtick*, to diſtinguiſh an *Hydrops Pectoris* from other more frequent Diſeaſes of the Breaſt, that give a Shortneſs of Breathing. His Lordſhip, though antient, was in all his *Viſcera* very ſound.

Perhaps it may not be impracticable to uſe the *Paracentheſis* in the like Caſe, when the Diſeaſe is certainly known, and without it Death is moſt likely to enſue.

Warm Water injected into the Thorax *of a Bitch; by Dr.* William Muſgrave, *n.* 240. *p.* 181.

XIII. *June* 21, 1683. I ſyringed ℥iv. of warm Water into the Right Side of a Greyhound Bitch, which cauſed a great Rigour (eſpecially in the hinder Parts) a Shortneſs of Breath, a burning Heat in the Fleſh: She looked heavy, was unwilling to riſe or ſtand long on her Feet. Thoſe Symptoms wore off by Degrees, ſo that in a Week's Time ſhe appeared as well as ever. *July* 2. I injected ℥xvj of warm Water into the Left Side of the *Thorax* of the ſame Greyhound; after which ſhe was extreamly hot, and ſhort breathed: I felt a violent Throbbing of the *Heart*, but the Rigour was not ſo great as in the firſt Experiment; ſhe recovered this alſo in the Space of a Week. *July* 15, I injected ℔ß of warm Water into one Side of the *Thorax*, and ℔ß into the other Side of the ſame Bitch: The Symptoms attending it were (as in the former Experiment) a Burning in the Fleſh, and a Shortneſs of Breath; they all went off, and in five Days ſhe ſeemed perfectly recovered.

Thus we ſee a Quantity of ℔iii¼ of warm Water has been injected into the *middle Venter* of the ſame Greyhound, within the Space of one Month; and if we may be allowed to judge of the Recovery by a perfect Ceſſation of all Symptoms, as to outward Appearance, we muſt then grant, that this Water was carried off thence, ſome way or other, in the ſame Time. I ſhall only add, that having ordered the Greyhound to be tied away, after one of the two laſt Experiments, within two or three Days, I obſerved the

Boards of the Floor where ſhe lay to be very wet, which I then imagined to be the Effects of the Injection, come off by Urine; perhaps as Nature hath furniſhed us with Veſſels to bring off that Humour which is thrown into the *Ventricles* of the *Brain*, and by tarrying there would prove fatal to us; ſo likewiſe there may be ſome *Ductus* yet unknown (to me at leaſt) which belonging to the *Thorax* may convey off thence what Liquor ariſes (either from the Condenſation of Vapours, or from the Rupture of *Lymphaticks*, or any other Way) in the Cavity, mediately or immediately, into the Blood: Certainly theſe Experiments, as alſo the many Hiſtories of *Empyema's* and *Dropſies* of the *Breaſt*, mentioned by Phyſicians as cured by large Evacuations by Urine, do in ſome Meaſure argue the Probability of ſuch a Paſſage.

The Paſſage of Chyle to the Breaſts; by M. —— *n.*65. *p.* 2083.

XIV. A *German* at *Montpellier* hath diſcovered the Veſſels which convey the Chyle to the Breaſts of nurſing Women, and ſhewed, that they do iſſue out of the *Ductus* of M. *Pecquet*,

A ſudden and exceſſive Swelling of a Woman's Breaſts; by Dr. W. Durſton. *n.* 52. *p.* 1047.

XV. *Eliz. Trevers*, 23 or 24 Years of Age, fair of Complexion, brown Haired, of an healthy Conſtitution, low of Stature, of honeſt Repute, but of mean and poor Parentage near *Plymouth*, went well to Bed *July* 3, 1669, and took good Reſt and Sleep; but in the Morning, when ſhe awaked, ſhe found her Breaſts ſo ſwelled and heavy that ſhe could not turn herſelf in her Bed, or ſit up; yet without all Pain and Weakneſs, either in her Breaſts, or in any other Part. I adviſed for the preſent only an emollient and temperately warm *Fotus*, and once I gave her a *Bolus*, upon which ſhe had 10 Motions *deorſum*, and the Swelling ſomewhat abated; but the Maid was ſo weakned upon it for 2 or 3 Days after, that I durſt not attempt any thing of that Nature ſince: *Sed quia paſſa fuit Suppreſſionem Menſium per ſex retrò Menſes, Diuretica nonnulla, & Sanguinis Menſtrui Prolectamenta præſcripſi.* The *Tubuli*, or Pipes of the Breaſts, are all very hard and ſwelled; and indeed, the whole Breaſts ſeem to be nothing elſe but thoſe *Tubuli*, and little or nothing but Wind or Water. As near as we can gueſs, the Left Breaſt weighs about 35 Pounds, but the Right ſomewhat leſs. And the Skin of the Back, Neck, and Belly, ſeem to be drawn towards the Breaſts to ſerve for the Diſtenſion. The Circumference of the Right Breaſt is 2 Foot 7 Inches, of the Left 3 F. 1 ½ Inch. The Length of the Right Breaſt from the Collar Bone 1 F. 5 ½ Inches. The Length of the Left Breaſt 1 F. 7 ½ Inches. The Breadth of the Right Breaſt, as it lies, 1 F. 1 Inch. The Breadth of the Left 1 Foot 4 ½ Inches.

Ib. p. 1049.

About the Beginning of *September*, ſhe brought up, in Coughing, at ſeveral Times, ſome Blood, but this I ſoon took off; and at that Time there appeared ſeveral cutaneous Ulcers upon her Breaſts and other Parts, *& abunde in Verendis* (*ut a Fœminis edocebar*) which laſt I cured; but thoſe on her Breaſts in Part remain, and daily diſcharge, by the ſole Application of Cole-leaves, good Quantity of ſanious Matter. She complained alſo of grievous interjuncture Pains, eſpecially upon the *Tibiæ*; whereupon I ap-

plied *Empl. de Ran.* and gave her three ſucceeding Mornings a Doſe, which the third Day wrought, *ſurſum deorſum*, pretty briſkly; after which her Pains vaniſhed, and many of thoſe *Ulcuſcula*; and her Breaſts, which at that Time were grown conſiderably bigger and very painful, much leſſened, and her Pains alſo; but *Oct.* 21 ſhe died. The next Morning we took off
n. 53. *p.* 1068. the Left Breaſt, and found it of 64 ℔ Weight. Upon the opening of it (in ſeveral Places) we could find neither Water, nor cancerous Humours, nor any thing vitious, more than the prodigious Bigneſs; and the *Tubuli* and *parenchymous* Fleſh were purely white and ſolid, and no other than what we ſee in the ſoundeſt Breaſts of Women, or the beſt Udders of other Animals. She had loſt her Stomach and Reſt ſeveral Weeks before, and made great Complaints of her Breaſts, from their great Diſtenſion; and her whole Body was exceedingly emaciated. The Breadth of her two Breaſts (as ſhe was laid out on a Table, being dead) I mean from the further End of the one to the further End of the other, was 3 Feet 2 ½ Inches. The Circumference of the Breaſts long ways 4 Feet 4 Inches. The Circumference of the Breadth 3 Feet 4 ½ Inches. The Right Breaſt we took not off, but we gueſs it weighed 40 ℔.

Some time before ſhe died I began a *Salivation* with her, which leſſened her Breaſts in Circumference ſome Inches; but ſhe proving not conformable, I was forced to deſiſt. But ſhe was wonderfully revived afterwards for ſome Time. I then cauſed a *Cauſtick* to be applied; upon which the *Eſchar* falling off, yet nothing iſſued out of the Breaſt. Then an Inciſion was made 2 ½
n. 54. *p.* 1074. Inches deep, but it was to no more Purpoſe than the former. I deſigned to have examined the *Viſcera*, but her Aunt (a fond extravagant Woman) diſappointed me. But indeed I believed there was little or nothing there extraordinary. For to the laſt, I could perceive no ill Smell from her Breath, or ſtreightneſs upon the Cheſt, or Painfulneſs in her Breathing; and the *Egeſta per Urinam*, &c. were well enough.

An aged Woman of 60 *giving Suck to her Grandchild in* Germany; *by* —— *n.* 105. *p.* 100.

XVI. Having taken a Nurſe for my little Girl, the Boy of that Nurſe having been on that Occaſion weaned, did, by repeated Sucking the Breaſts of his Grandmother, a Woman of 60 Years of Age, cauſe ſuch a Commotion in her, that abundance of Milk ran to her Breaſts for a ſufficient Nouriſhment to the ſaid weaned Boy, whom alſo my Nurſe, his Mother, after ſhe returned Home upon the Death of my Girl, now again gives Suck to, though her Breaſts had been for ſome Weeks dried up.

Ibid. *N. B.* This Relation was ſent by a Perſon of great Veracity, and may be confirmed by two other like Stories recorded by *Diemerbroeck*, in his *Anatome Corporis Humani*, *Lib.* II. *Cap.* ii.

XVII. *A Paper omitted*, viz.

n. 105. *p.* 100. A Relation concerning a Woman of 66 Years of Age who gave Suck to her Grandchild; and another Woman, who recovered her Milk after it had, for 8 whole Months, been quite dried up. *Extracted from M.* Diemerbroeck's Anatome Corporis Humani.

XVIII.

XVIII. *Accounts and Emendations of Books omitted*

1. JOH. *Swammerdam*, M. D. *Amſterodamenſis*, de Reſpiratione & Uſu Pulmonum. *n. 28. p. 534.*

2. Tractatus duo, prior de Reſpiratione; alter de Rachitid. —— *Mayow. Oxon.* 1668. in 8°. *n. 41. p. 833. n. 105. p. 110.*

3. De Reſpirationis Uſu Primario Diatriba; Auth. *Malachia Thruſton*, M. D. cui accedunt Animadverſiones à Cl. Viro in eandem conſcriptæ, una cum Reſponſionibus Authoris. *Lond.* 1670. *n. 56. p. 1142.*

4. Ἀντιδιατριβη ſive Animadverſiones in *Malachiæ Thruſtoni*, M. D. Diatribam, de Reſpirationis Uſu Primario. Auth. *Georgio Entio*, Equ. Aur. M. D. *Lond.* 1679. in 8°. *n. 142. p. 1072.*

5. An Epiſtolary Addreſs made to the Grand Duke of *Tuſcany*, touching the whole Doctrine of Reſpiration; by *Laur. Bellini*, at *Piſa*. *n. 65. p. 2093.*

6. Novæ Hypotheſeos, de Pulmonum Motu & Reſpirationis Uſu, Specimen. *Lond.* 1671. in 8°. *n. 70. p. 2141.*

7. *Joh. Nicolai Pechlinii*, M. D. de Aeris & Alimenti Defectu, & Vita ſub Aquis, Meditatio. *Kiloni* 1678. in 8°. *n. 127. p. 67.*

8. De Catarrhis à *Rich. Lower*, M. D. in 8°. *n. 73. p. 2211.*

9. Phthiſialogia *Lancaſtrienſis*; cui acceſſit Tentamen Philoſophicum de Aquis Mineralibus, &c. Auth. *Carolo Leigh*, M. D. *Lond.* 1694. in 8°. *n. 77. p. 3017. n. 1002. p. 206.*

10. Tractatus de Corde, item de Motu & Colore Sanguinis & Chyli in eum tranſitu: Cui acceſſit Diſſertatio de Origine Catarrhi. Auth. *Rich. Lower*, M. D. *Lond.* 1669. *Amſtel.* 1661. in 8°. *A Correction is here made of an Error of the Preſs, concerning the Circulation of the Blood, which paſſeth through the Heart* Thirteen (*not* Six) *times in an Hour*; *and of a Miſtake committed by the Author himſelf.* *n. 45. p. 909. n. 73. p. 2211.*

11. *Pet. Chirac.* de Motu Cordis Adverſaria Analytica. *Montſp.* 1698. in 12°. *n. 263. p. 556.*

12. *Ejuſdem* Diſſertatio Academica; An Incubo Ferrum Rubiginoſum? *Montſp.* 1694. in 12°. *Ib. p. 565.*

CHAP. IV.

The ABDOMEN.

An Abſceſs in the Liver, Stones in the Gall-Bladder and conjoined Kidneys; by Dr. Edward Tyſon. *n. 142. p. 1035.*

I. SEpt. 14. 1678. Opening the Body of a Reverend Clergyman at *Oxford*, we obſerved the *Liver* to be very large, and faſtened to the *Diaphragm* more than uſually; the *Colon* ſo firmly joined to the *Liver*, near the Gall-Bladder, that I could not ſeparate it without Inciſion. The

gibbous Part of the *Liver* towards the Right Side, appeared diſcoloured, where making an Inciſion, there plentifully iſſued out a perfect *Pus*, very fœtid; as likewiſe there did from a Wound I made in its cavous Part near the Fiſſure. This *purulent* Matter I found not contained in any particular *Cyſtis* or Bag, but in ſeveral *Sinus's* in that Part of the *Liver*; whereas the other Parts ſeemed ſound and well coloured. This *Abſceſs* may well be preſumed the Cauſe of that lurking *Fever* that took off the Patient, he labouring under it about 6 Weeks, yet without much Complaint of Sickneſs, but troubled with irregular Heats; yet ſometimes ſuch as were imperceptible to himſelf: Twice or thrice, but at great Diſtances, he had *Paroxyſms* of chill Fits like an *intermittent Fever*, but ſuch a *Fœtor* and Drineſs in his Throat as proved obſtinate to all Medicines. His approaching Death was attended with other Symptoms that uſually follow the Affection of the *Brain* and *Genus Nervoſum*.

Formerly he had been often ſubject to the *Yellow Jaundice*, though at preſent nothing thereof appeared. The *Gall-Bladder* was filled and crammed with Stones, the *Meatus Cyſticus* and *Ductus communis* even to the *Duodenum* were very much extended with them; and in the *Porus Bilarius* alſo I met with ſeveral ſmall ones. There was no fluid *Gall* contained in the *Bladder*, but ſome that was ſoft, of a deep Yellow Ochre Colour that filled up the Interſtices of the Stones. Theſe Stones were of a various Bigneſs, from that of a large Nut, or Nutmeg, to a Pepper-corn: Their Colour was of a darkiſh Yellow Ochre, although in ſome there appeared *Laminæ* of a Browner Colour. To the Touch; when a little dry, they ſeemed ſoapy: Their Weight was light, and their Scent very fœtid, reſembling that of the *purulent* Matter in the *Liver*. Their Conſiſtence was friable; their Figure for the moſt part triangular, or inclining to that Figure, but all angular. That Side toward the *Gall-Bag* was protuberant and convex, the other two Sides were flat; ſo that having the leſſer Angle towards the Center of the Cavity of the *Gall-Bladder*, like ſo many Wedges, they more compleatly filled it: I numbered I think above 36. Whether this *triangular Figure* may be from the Shooting of ſome *Salts* in the *Gall* is hard to determine: But however, I ſuppoſe, it will be found, that they uſually affect this *Figure*; as in ſome others I have by me, taken out of the *Gall-Bladder* of a Woman at *Oxon* ſome Years ago, it does more plainly appear; which are alſo light, do feel ſoapy, conſiſt of *Laminæ*, are of a whitiſh Colour, not ill-ſcented as the former, and of a *triangular Figure*.

Fig. 11. We were ſurprized to obſerve an unuſual Structure and *Conjunction* of both *Kidneys*, the *Parenchyma* of the one being continued over the *Spine* unto the other, ſo that they both made but one continued ſemilunary Body. They were very large, and that Part that conjoined them, and lay over the *Spine*, was ſomething leſſer than the true *Kidneys*, and in its outward Tunicle or Membrane had 3 Seams, although that *Parenchyma* inwardly ſeemed not to obſerve ſuch a Diviſion, but was the ſame with the Subſtance of the *Kidneys*. The *emulgent* Veſſels were very numerous; for beſides two larger Veins that were ſubdivided into ſeveral leſſer Ramifications, there

were

were divers others that were ſingle, even to their Inſertion into the *Vena Cava*. The middle Part likewiſe, by which both *Kidneys* were conjoined, was plentifully provided with Blood-Veſſels; for it received from the *Aorta* two Arteries, which before their Inſertion were each ſubdivided into three Branches; and it ſent out two Veins, which being joined afterward into one, entered the *Vena Cava*. Beſides, at the Seam at the lower Part of the left *Kidney* it had a Vein and Artery, which afterwards inſerted themſelves into the *Iliac* Branches of the *Aorta* and *Cava*; ſo that Nature, though erring from her wonted Rule in forming this Part, yet was provident in furniſhing it with Veſſels. But to the whole Compages of the *Kidneys* there belonged only two *Ureters*, but the great Dilatation of the *Pelvis* in each was remarkable; that of the left *Kidney* was the larger, and had a triple Origination, the Right had but a ſingle one, and was leſs.

I am apt to think that this Structure of the *Kidneys* might occaſion as well the great Dilatation of the *Vena Cava*, as alſo of the *Pelvis*; for the middle Part conjoining both the Kidneys, lying over the *Vena Cava*, by its Weight preſſing thereon would hinder the free Return of the Blood, which yet would make room for its ſelf by enlarging its own Channel, which was ſo capacious as to contain 3 or 4 of my Fingers. So likewiſe the *Ureters* running over that Part that conjoins the *Kidneys*, like Strings over the Bridge of a Viol, in ſome Poſition of the Body they might have their Paſſage ſo ſtreightened, that the *Urine* being impeded and regurgitating, might ſwell and ſtretch the Membrane of the *Pelvis* to this Greatneſs.

Explication of the Figure.

A, the Right *Kidney*. *B*, the Left. *C*, the middle Part conjoining both *Kidneys*. *d e f*, three Seams in the Tunicle of the *Kidneys*. *G*, the *Arteria Aorta*. *b b*, two Arteries from the *Aorta*, which afterwards are ramified into three, and ſo inſerted into the ſaid middle Part. *I*, the *Vena Cava*. *KK*, two Veins ariſing from the middle Part, which uniting into one, entered the *Vena Cava*. *L M*, a Vein and Artery ariſing at the Seam *f*, which at laſt are both inſerted into the *Iliac* Branches of the *Aorta* and *Vena Cava*. *N M*, the *emulgent* Arteries. *O O*, the *emulgent* Veins; whereof ſome are ſingle, others variouſly ramified. *P P*, the *Pelves* of both *Kidneys*; that of the Left was extream large. *Q Q*, the two *Ureters*.

A Liver appearing Glandulous to the Eye; by Mr. J. Brown. *n.* 178. *p.* 1266.

II. I ſend you here the Figure of the *Liver* of an *hydropical* Perſon. He was about 25 Years of Age, a Soldier in one of his Majeſty's Regiments here in Town, who contracted his Diſtemper by drinking much Water, when he could not ſtir from his Duty, and catching Cold at Nights in being upon the Guard. He was under the Care of our Phyſicians in St. *Thomas*'s Hoſpital for ſome Time, by whoſe Directions his Swellings did by Times abate; but afterwards it was obſerved, that the Method which had been beneficial to others, had not here the like Succeſs, his Swellings returning upon him as before; ſo that there was nothing more now to be thought of but a *Paracentheſis*; which Operation however we judged very hazardous, by Reaſon of the Time of the Year, and for that the Patient was very much emaciated; yet he being ſo much ſwelled that it was uneaſy to him to lie in his Bed, he importuned us very often, and with great Earneſtneſs, that the Operation might be performed. Hereupon a *Paracentheſis*, by the Phyſicians Conſent and Directions, was made be me, *Nov.* 14, 1685, whereby we drew from the Patient about 3 Pints of briniſh Liquor, and within 4 Days after as much more; the next Morning he died; and his Death, as was found upon Diſſection, was partly occaſioned by a Mortification upon his *Scrotum* and *Penis.* Upon opening the Body, I believe I took out about 24 Quarts of Water; he had a large Inflammation upon the *Peritonæum*; all his other inward Parts not much diſaffected, except the *Liver*, which now I am going to deſcribe to you.

Fig. 12. Its Magnitude was not extraordinary, but rather ſeemed leſs than uſual. But that which was very remarkable (and I think the like Caſe ſcarce ever obſerved by any Author) and ſeems much to confirm the Opinion of the learned *Malpighius*, is this; It conſiſted, in its concave, convex, and inward Parts of *Glands*, which (with the Veſſels) made up the whole Subſtance thereof. Theſe *Glands* contained a yellowiſh *Ichor*, like ſo many *Puſtules*, and was, I ſuppoſe, Part of the *bilious* Humour lodged in the ſame; though otherwiſe the *Liver*, between the *Glands*, was of its uſual reddiſh Colour. In the Bladder of *Gall* we found a ſoft friable Stone, but otherwiſe nothing conſiderable in that Part.

Explication of the Figures. *A A A*, deſcribes the *Glands* in the concave Part of the leſſer *Lobe* of the *Liver*. *B B B*, the *Glands* in the concave Part of the greater *Lobe* of the *Liver*, which were of different Magnitudes, though in general they were much leſs in the Leſſer than in the Greater. *C C C C*, the inward Part of the greater *Lobe* of the *Liver*, as it was divided. *D D D D D* are ſeveral black Specks that appeared inſerted in thoſe *Glands*, which were probably from the Divarications of the Veſſels being divided upon opening this *Lobe*. *E*, the *Veſicula Fellis*, which was of a greeniſh Colour. *F*, the *Vena Porta* tied up with the *Ductus Biliarius*, &c. *G*, a particulat Set of *Glands*, lodged between the ſame and the *Vena Cava*. *H*, the *Vena Cava*. *I*, Part of the *Ligamentum Suſpenſorium*. The convex Part of the *Liver* was in every reſpect, the ſame with the concave Part of both *Lobes* as to its *Glands* here deſcribed.

The Texture of the Spleen; by S. Malpighi. *n.* 71. *p.* 2150. III. I have obſerved the Fibres of the *Spleen*, which have puzzled ſo many Anatomiſts, not to be nervous (as I ſometime imagined) but fleſhy. So that from its external Involucrum, and the tranſverſe Fibres produced from it, there is compoſed a very ſingular Kind of Muſcle, compreſſing the Cells of the Spleen, whereby the Blood is propelled through the Veſſels of the *Viſcus* in the Manner, and by ſomething of a ſimilar Structure to that which is obſerved in the large *Auricles* of the Heart. For the ſtrong fleſhy Fibres, running acroſs the Spleen, are ſo interwoven with one another as to form a Kind of Net-work, compreſſing the Membranous Cells, and their Extremities wonderfully produced, make the fleſhy Covering of the Spleen.

The Uſe of the Spleen; by M. Mich. Behm. *n.* 34. *p.* 651. IV. Dr. *Highmore* and others have juſtly abſolved the *Spleen* from an acid melancholic Juice, and from Sanguification. I have ſeveral Times obſerved the Spleen, while it was yet warm, reſemble the Lungs in Spongineſs, and could be very much diſtended not only with Air, but with coloured Liquors; by which means its Veſſels, Connexions and Uſes explained by Dr. *Highmore*, were rendered more manifeſt. But begging that ingenious Gentleman's Pardon, I cannot help doubting whether theſe numerous whitiſh Veſſels are Nerves turgid with animal Spirits, or rather Tendinous Fibres, ſerving for the Dilatation and Contraction of the Spleen, as in the Lungs. For I imagine that the Blood, which is not ſufficiently mixed with the Chyle in the Heart, is mixed more intimately in the Spleen, and ſtrained in it as through a large Sponge; its more watery Parts being ſent off by the *Pancreas*, and then ſtrained anew through the Liver for the Separation of the Bile, and when the Blood, either by its Motion or any violent Accident, diſtends the Heart too much, then leſt that Organ ſhould be oppreſſed, or the Head affected with the too great *Impetus*, the Spleen receives a great Part of the Blood, as may be felt by any one from its Swelling and Pulſation, emulating the Heart, when the Body is very warm. I believe the Spleen and *Meſentery* may be affected by Diſorders of the *Meſentery* and the Hypochondriac Diſeaſe, but I imagine that theſe Diſorders ſeldom or never ariſe from a Fault in the Spleen.

Obſervations about the Spleen *and* Liver; *by* *S.* Jacomo Grandi. *n.* 58. *p.* 1188.

V. In my Anatomical Diſſections of the firſt Year, after I was made the *publick Anatomiſt* at *Venice*, I met with nothing curious, but the *Virſungian Channel* manifeſtly inſerting itſelf in the *Spleen*, and admitting a Silver *Stiletto*; which I had never obſerved in any Corps: And then a *Liver* divided into 5 *Lobes*, together with a *Spleen* of the Figure of a Saw, of extraordinary Bigneſs. Laſt Year, one drowned, of about 35 Years of Age, had the *Lacteous Veſſels* ſo apparent and ſo big, that having ſhewn them how they lay in the Body, I ſhewed them yet the Day after in the *Meſentery*, taken out and diſplayed upon a Table.

A diſeaſed Spleen; by Dr. Neh. Grew. *n.* 194. *p.* 543.

VI. A Daughter of Mr. *Thomas Sedgwick*, Merchant in *London*, when ſhe was fourteen Years of Age, entered with a Miſtreſs to learn *Embroidery*, in which ſhe was ſo aſſiduous, that ſhe ſpent whole Days, and almoſt every Day upon it, for the Space of two Years. Hence a melancholic Diſpoſition which was natural to her became morbid, accompanied with Paleneſs, want of Appetite, Obſtructions of the *Menſtrua*, and a Cough; and after three Years, with a heavy Kind of Pain in her left Side below, which continued till her Death. She died of a Fever, in her twentieth Year, and her Body being opened, I found the Lungs, Liver, and all the other *Viſcera* ſound, except the Spleen, which was ſurpriſingly increaſed in its Bulk and ſwelled, being more than two Inches thick, four broad, and almoſt ten long. So that, though the human Spleen, when it is ſound, ſcarcely weighs five Ounces; in this young Woman it weighed upwards of twenty-five And as this Viſcus when it is morbid, for the moſt Part grows hardened with ſchirrous blackiſh Tumours, here on the contrary, its whole Subſtance becoming putrid, ſent forth a fœtid Steam, and it was ſo very ſoft and friable to the Touch, that it appeared like grumous Blood, and broke by its own Weight if you offered to lift it. For all this, it was of a florid red Colour both within and without, and there was no Ulceration, nor Matter truly purulent to be obſerved in it.

In this Caſe three Things are to be conſidered, *viz.* her Manner of Life, her Age, and the Period of her Age. For firſt, from ſuch a long Want of Exerciſe, an unequal Diſtribution of the Aliment muſt neceſſarily happen. And as the Bones, and frequently the *Viſcera*, are increaſed above their natural Size in the Rickets, from an unequal Nutrition, ſo in this Caſe the Spleen, from the ſame Fault in the Nutrition, ſeems to have received too great a Bulk. Eſpecially as in the ſecond Place, the Want of Exerciſe happened in the Time of Life before the Parts were grown to their full Size. For Exerciſe is very neceſſary to promote even a due Nouriſhment; and ſtill more for the equal Growth of the Parts. And in the third Place, it happened in that Period of Life, when the Menſtrual Diſcharge begins firſt to appear; which thereby being ſuppreſſed, or at leaſt very much diminiſhed, that Blood, which ſlothful Nature neglected to ſend off in the uſual Way, fell partly upon the Spleen, as a kind of Diverticulum for it. Want of Exerciſe is therefore moſt hurtful to Girls about this Age, that is, from fourteen to twenty or thereabouts.

A Polypus in a Dog, near the Spleen; by Dr. Will. Muſgrave. *n.* 266. *p.* 690.

VII. In a *Dog* which was diſſected privately at *Oxford*, we happened to fall upon a globular Body near the *Spleen*, at firſt Sight very much reſembling a Gland. It was three Inches in Diameter, and had a Coat reſembling that of the Veins. On each Side of it we obſerved a Vein, *viz.* a Branch of the Splenick, going to the Coats of this round Body. Having opened it, we obſerved its Subſtance fleſhy, but confuſed, imperfect, and inteſperſed with grumous Blood. Through its Middle a Paſſage was allowed to the Blood, and its Bulk ſeemed to argue that it was long a growing.

The Structure of the Glands; *by Sir* Edm. King. *n.* 52. *p.* 1046.

VIII. As I have Opportunity, I ſhall ſhew, I hope, that all Sorts of *Glands* (ſo called) are nothing elſe but Veſſels (and their Liquors) variouſly wrought, and Receptacles of ſeveral Liquors for divers Uſes; the Difference of which alters their Colour, Conſiſtence, *&c.* My Meaning is, that there is no reputed *Gland* in any other Thing than in the Body of the *Teſtis*; *viz.* That it hath not this, or that intermediate Subſtance, but that the Liquors regularly come and go to and through them in fine Tubes (in ſuch and ſuch Heaps and Figure, as may make them appear ſo and ſo formed in ſeveral Parts of the Body, where they are ſituated) as alſo, that the more conſpicuous Veſſels of the Body have other Veſſels that help to make up their Coats, and ſerve for the Nouriſhment of the ſame, beſides ſuch as import or export thoſe Liquors, for the Conveyance of which they were deſigned for common Uſe.

The Uſe of the Glands; *by* Gaſp. Bartholine. *n.* 164. *p.* 753.

IX. Thoſe Diſcoveries which have been made concerning the *Pancreatick Duct* and *Juice* by the Induſtry of later Anatomiſts, have opened a Way for finding out the Veſſels of other *Glands*, and aſſigning their proper Uſes.

For a Gland now, wherever it is found, is no more reckoned uſeleſs or unactive, and only fit to carry off ſome ſuperfluous Humours, but rather ſerves as a Strainer to ſeparate a Fluid from the Blood neceſſary for the Preſervation and Well-being of the Individual. For as the Blood is ſent to all Parts of the Body by Arteries, and before it can return from them by the *Capillary Veins*, muſt depoſite various Particles in ſome of them, which are ſeparated by peculiar Veſſels (commonly called Excretory by Anatomiſts) hence that ſurrounding Subſtance between the *Capillary Arteries* and the Orifices of the Excretory Veſſels properly deſerves the Name of a Strainer or Sieve, as it keeps back the whole Maſs of Blood from paſſing, and only allows certain Particles ſecreted from it to get thorough. It is called likewiſe *Parenchyma*, *Affuſio*, or the Fleſh of the *Viſcera*. So in the Blood, after the mutual Action of the different Humours upon one another, Particles of different Kinds ſeparated from the whole Maſs, find out proper Paſſages for themſelves through theſe Sieves. And whoever rightly comprehends this general Deſcription of a Sieve, will at the ſame Time underſtand the Conſtruction of all the *Viſcera* which have Excretory Veſſels. But ſuch are thoſe *Viſcera* which are commonly called Glands, and which have hitherto been uſed to be divided, upon Account of their Structure and Figure, into the received Diſtinction of *Conglobate* and *Conglomerate*.

The *Conglobate Glands* are thoſe, which have an equal Surface, are formed as it were of one continued Subſtance,and that Kind of *Lymphatick Excretory Veſſels*, which was firſt diſcovered and deſcribed by my Kinſman *B. M.* But the Diſtribution of theſe *Lymphaticks* through the *Conglobate Glands* is thus. Some of them are ſpread upon the Surface of the Glands in their Origin; ſome go from the concave Part of one Gland to the convex Part of another; and ſome again are continued from the concave Part of theſe Glands to the Place of their Inſertion in the *Vena Cava*, and that either immediately, or by Means of the intermediate *Thoracick Duct*. So that all theſe *Lymphaticks* which carry off the Fluid ſeparated from the Blood in the *Conglobate Glands*, return the ſame Fluid as it were in a Circle back again to the Blood. Such Glands are found in the *Meſentery* between the Veſſels which receive the *Chyle* from the *Inteſtines*, and the Roots of all the Receptacle of the *Chyle* in the Loins near the *Vena Portarum*; between the *Lymphaticks* of the Liver, and the Roots of the ſame Receptacle; in the Loins, Groin, about the Lungs, in the *Maxilla*, the Neck, the *Fauces*, under the Arm-pits, in the *Omentum*, and elſewhere. I remember I once found in an Hoſpital at *Florence*, in the Body of a Woman deceaſed, two *Conglobate Glands* with their *Lymphaticks* of an extraordinary Size, in the Fat between the Skin and the Muſcles of the Abdomen in the left *Ilium*. In the Body of another Woman there who died of a Dropſy, having opened the *Abdomen*, I found it quite full of Water, and all the Glands, which ſeemed more numerous than uſual, appeared to me to be ſchirrous and full of a purulent Kind of Matter. I could not help wondering at the unuſual Number of Glands, and their preternatural Bigneſs, the laſt of which I attributed to the contained *Morbifick Matter* diſtending them. But as to the unuſual Number of them, I was in doubt, whether any new ones could be produced which did not exiſt there before, or whether thoſe Glands which before were ſo ſmall as not to be diſcernable, were now ſo much increaſed in their Bulk, as to become remarkably viſible, as is certain in the Glands of the Breaſt, which exiſt in all, but are more obſervable in ſome than in others.

Certainly a true Knowledge of the *Conglobate Glands* muſt be of great Service in explaining the Nature of that troubleſome obſtinate Diſeaſe the *Scrofula*, and the Symptoms which attend it. For you frequently enough ſee large Sacks contained within the *Conglobate Glands*, full of either a yellowiſh, or a Gypſeous Kind of Matter, which is eaſily diſcovered to be the thicker Parts of the *Lymph*, ſtrained through the Glands, and not finding a free Outlet, gradually increaſe and form Cavities for themſelves. But what is ſaid concerning the Sympathy between the Glands of the Neck and of the *Meſentery*, ſeeing for the moſt Part when there are ſcrofulous Swellings in the Neck, the ſame Kind of Swellings are found in the *Meſentery*, this is not owing to any immediate Communication between the Neck and *Meſentery*, nor any occult Sympathy that is betwixt them, but to the ſame Blood depoſiting the ſame Kind of Contents into all Glands of the ſame Nature and Sructure. Hence it follows, that if the Quantity of Matter is ſmall, there will either be only one Gland affected, or a good many together, but obſcurely; but if the Quantity is large, there will be more Glands filled with it, and if the Nature of the Blood be afterwards changed by reſolving Liquors, the above-mentioned Matter being reſolved in the Glands, the Humours will diſappear.

The *Coglomerate Glands* are compoſed of various Parts and of leſſer Glands as it were, with an unequal Surface. They have only *Lymphaticks* going out from them, and quite of a different Kind from thoſe of the *Conglobate*, ſeeing they immediately depoſite the Liquor ſecreted from the Blood in the Glands to which they belong, into proper Cavities; as the *Salivary* Glands into the Cavity of the Mouth, and the *Pancreatick* into the *Cavity* of the *Duodenum*; and all Glands of this Kind, at leaſt thoſe whoſe *Excretory Veſſels* are hitherto diſcovered, furniſh a Liquor, whereby the Reſolution of the Aliment is firſt begun. Hence theſe Glands are found chiefly in the Mouth, and through all the Tract of the Alimentary Canal, either ſmall and ſolitary, or heaped up in Cluſters. And when they are ſituated on other Parts of the Body, ſuch as the Glands of the Eyes and Noſe, as ſoon as the Humour ſecreted in them has beſmeared the Eye-Lids, and falling into the Noſe (by the Canals called formerly the *Puncta Lachrymalia*) has ſerved, together with the Humour of the Noſtrils, for the Application of odoriferous Particles, it is at length derived into the Alimentary Canal, together with the above Humour flowing from the Noſe.

If we enquire into the Structure of Glands, we will find, that a great many Things impoſe upon us by the Appearance of Fleſh, as it is commonly called, which are really *Excretory Veſſels*, as is the Caſe in the *Kidneys*, as *Malpighi* obſerves. For as in the Kidneys the greateſt Part of the Subſtance which the Ancients took for Fleſh, is compoſed of very minute

Canals, through which the Urine flows into the *Pelvis*, and is ſurrounded by a real Glandular Subſtance for the Secretion of Urine; ſo a great Part of it likewiſe which we conſider as a *Parenchyma* or peculiar Kind of Fleſh in the Glands, is compoſed of various Convolutions of ſmall Tubes and *Excretory Lymphatick Veſſels*, Nerves, Blood Veſſels, and I may add fleſhy Fibres, with which the Subſtance of the Glands is not only ſurrounded, but connected together.

The ſpiral Structure of the Fibres of the Inteſtines; by Dr. Will. Cole. *n.* 125. *p.* 603.

X. The mechanical Reaſon of the *periſtaltick* Motion of the Inteſtines is by ſome Anatomiſts deduced principally from *annular* Fibres, conſtituting, according to the received Doctrine, one of the Coats of them. Others are of Opinion, that they are rather numerous, though ſmall *ſphincter* Muſcles, than ſingle Fibres, to which that Motion is to be attributed; Muſcles being in moſt, if not all other Inſtances, owned to be the adequate Inſtruments of Motions analogous to this; and Fibres, though abſolutely neceſſary, yet being no otherwiſe ſo than as (a Number of them being collected, and fitly diſpoſed) they conſtitute a Muſcle. But I found it very difficult to conceive how the actuating Matter could be tranſmitted from one Fibre or Muſcle to another, down along the whole Tract of the Inteſtines, ſince, according to this *annular* Suppoſition, each ſingle Fibre or Muſcle muſt be diſtinct, a latent Contiguity being all that can be pretended. This, and many other Difficulties which occurred to me, put me upon a ſtricter Examination. I made the firſt Experiment in a Portion of the upper *Inteſtines* of an Ox; which, by reaſon of their Largeneſs of Proportion to thoſe of moſt other Species of Animals, ſeemed fitteſt for the Trial; afterwards in thoſe of Sheep and Calves, and not only in the ſmaller *Inteſtines*, but in the *Colon* and *Cæcum* alſo. The Circumſtances and Reſult of which Trials are as follow:

To effect a due Disjunction of the Membranes and Fibres (which I found it was hard, if not impoſſible, for me to make, while it was raw) I was fain to cauſe the *Inteſtines* of Oxen to be boiled 5 or 6 Hours, of Sheep 4; whereby the Compages of the Parts were ſo looſened, that the two outward Coats, *viz.* the common one, and that conſiſting of *right* Fibres, were eaſily ſeparated (if it were attempted ſoon after it was taken out of the Water) from that to which my Search was deſtined, and left thoſe reputed *annular* ones naked (though, by the Way, too long Coction would prove prejudicial on the other Hand, by too much intenerating the Fibres) Theſe at the Top of the *Inteſtines*, I attempted to ſeparate from one another; and when thoſe that had been decurtated by the unequal Cutting of the Knife were taken off, I found,

1. That I could not ſeparate a ſingle Fibre from his Fellows to any conſiderable Diſtance, all of them (to my Obſervation) being very ſmall, and in the Separation running ſmaller and ſmaller, and withal by reaſon of their Implication or ſtricter Coheſion one with another eaſily breaking; but a Congeries of them (to be obſerved eſpecially, though not preciſely always, in thoſe Places where, by gentle extending the *Inteſtine* ſeveral Times, and then letting it return again, the Coheſion of the ſeveral Series of

them became looſened) which, at firſt View, would reſemble a pretty large Fibre, would, without much Difficulty, riſe together; the very ſmall conſtituting Fibres of which Cluſters, yet if the Boiling had been very long continued, whereby the Compages was very much relaxed, would, in the raiſing, be very apt to ſeparate from one another, and appear diſtinct by reaſon of their Inſertion by and by to be mentioned.

2. That when beginning at the Top, I attempted the Separation of one of theſe (ſuppoſed *annular*) Cluſters of Fibres towards my Right Hand (on that Side of the *Inteſtine*, I mean, which was turned towards me) a whole Ring would come off together (excepting that ſome *Fibrillæ*, which riſing from contrary Parts, decuſſated one another at the Top in that *Phaſis*, would a little retain it) but endeavouring it towards my Left, I found, for the moſt Part, I could eaſily enough unravel that Cluſter to a conſiderable Length, *viz.* That of ſometimes more than 2 or 3 Spans, before Ruption (of the whole Cluſter I mean) which yet at laſt it would be ſubject to. For,

3. Though thoſe Convolutions, as to the greateſt Part of them, appeared diſtinct, yet I found, that from every one of them, at ſhort Diſtances, ſome Fibres did obliquely, and the moſt of them, to my beſt Obſervation, according to the Courſe of thoſe I have mentioned, inſert themſelves into the next Convolution, and become a Part of it; though withal, ſome I obſerved to have a contrary Tendency, and rather ſeemed to aſcend from the lower to the upper Convolution, and help to conſtitute it, and ſo to obſerve the Courſe mentioned; nay, ſometimes would go further than the next Convolution, and running under it, apply themſelves obliquely to ſome higher, which yet being in a ſmaller Number than the reſt that lay in the Order contrary to them, did not very much hinder the Diſſociation of the main ones: Which Fibres breaking off, and that in ſome Places in greater Numbers than in others, would at laſt (and the ſooner if the *Inteſtine* began to grow dry, which it would quickly do) cauſe the whole Cluſter to break off.

4. I obſerved, that as the moſt of theſe Fibres would by Degrees, according to the Order of the Convolutions, inſert themſelves into the next, ſo ſome of them would (in the ſame Order) paſs over it, and more (ſo far as I have obſerved) would run under it, and either adjoin themſelves to ſome more remote, or elude my Searching by hiding themſelves under them. This Inſertion of theſe Fibres ſeems to be the Reaſon of the *annular Phaſis*, that I mentioned even now, in the contrary way of Separation; for the attempting it contrary to their Order, muſt hinder in ſome meaſure the ready Diſſociation of the next Convolutions upwards; eſpecially near the ſevered Extremity, where there is leſs Reſiſtance of the adjacent Parts; the mentioned Fibres alſo ſeeming ſomewhat bigger, and conſequently ſtronger, in the upper, than after their Inſertion into the lower Convolution: Though indeed,

5. I found, that if I began at a lower Part of the *Inteſtine*, and tried to unravel upwards, there was not much more Difficulty in ſo doing, than when beginning above, I attempted it downwards; of which the Reaſon, I ſuppoſe, might be the Tenderneſs of the Part occaſioned by long Boiling,

whereby I could not perhaps judge of the Degrees of Renitency in thoſe ſmall Fibres. In this contrary Way of Separation too, the Operation, I obſerved, would not ſucceed unleſs I attempted it in the contrary Order, *viz.* towards my Right Hand.

6. When, before Boiling, I cauſed the Inſide of the *Inteſtine* to be turned outward, as I did in two Trials, and afterward by taking off the glandulous and vaſcular Coats (which I think to be diſtinct from one another, as I ſaid before of thoſe conſiſting of Right Fibres, and the ſuppoſed *annular* ones) endeavoured to unravel the Fibres, I found they would come off in the contrary Order, *viz.* from my Left Hand toward my Right; which I conceive confirms the Obſervation above delivered, in regard the *Inteſtine* being inverted, the Order of Separation muſt be ſo too; though I found (or thought) the Operation more difficult, by reaſon of ſome Fibres lying in the oppoſite Order (mentioned under the third Particular) and in this Appearance lying uppermoſt.

7. In one of theſe Attempts of unravelling the Fibres of the *Inteſtine* of an Ox, ſo inverted, I found, that though the Fibres I took up came off in the Order I juſt now mentioned, yet running over ſome others, they made a more oblique Excurſion, and for 2 or 3 Convolutions left betwixt them a conſiderable Area of Fibres, amounting (according to my Conjecture) to 5 or 6 times, or more, the Breadth of thoſe that ſo came off, till going deeper and deeper among the other Fibres, and at laſt running under them, they could be no longer traced, but brake off. Whether this be uſual, or only *Luſus Naturæ*, I cannot determine.

8. I found it much more difficult (in that one Trial I made) to unravel the Fibres of the *Cæcum* than the other *Inteſtines*, which ſeemed more interwoven than thoſe of the reſt, and to have contrary Tendencies one among another.

This is the Sum of my Obſervations hitherto concerning this Coat, which I take leave to think one *concave* and *helical Muſcle* (if I may ſo ſtile it) And that it might be ſuppoſed ſuch, the forementioned Inſertions ſeemed to evidence, they appearing to me in the ſeparating appoſitely enough to repreſent the Fabrick of a Muſcle delivered by the accurate *Steno.* Where the Tendons of it are fixed, is not evident; but if I may have the Liberty to conjecture, I ſhould think the upper of them to be radicated (at leaſt) at the *Pylorus* (if not as high as the *Sphincter Gulæ*, if this be not it) ſince the carneous Coat of the *Stomach* being, by the Learned Dr. *Willis*, found to be a Muſcular Contexture, and there being a Continuation of Motion between that Part and the *Inteſtines*, it ſeems to me not altogether improbable they may be but one Muſcle; and the other at the *Anus.*

The Motion of the Stomach *and* Guts; *by* Dr. Chr. Pitt. *n.* 243. *p.* 278.

XI. In the Diſſection of a Dog, in *July* 1685, I obſerved that the *Periſtaltick* Motion of the *Guts* was continued through the *Stomach*; the *Pylorus* (that uſually appears, after opening the Dog, as high as the *Diaphragme*) being in every waving brought below the very Bottom of the *Stomach*, I could manifeſtly obſerve a Conſtriction in the Middle of the *Stomach*, at every Motion downward, paſſing it in ſo as to be able to compreſs what was contained in its Cavity: And theſe Motions were as regular and orderly as ever I ſaw it in the *Guts*. I have ſince ſeen the ſame Motion in 2 or 3 others; ſo that one may ſafely conclude it holds true in all. The Motion of the *Stomach*, being after this manner, may give us a clear Account of the Quickneſs of the Diſtribution of the Nouriſhment; the Meat being no ſooner opened by the Spittle and Liquor that we take in, than that it has a free Motion by the Deſcent of the *Pylorus* into the *Inteſtines*, which is almoſt *pleno flumine* from this Compreſſion in the Middle of the *Stomach*.

The Cure of a Horſe ſtaked into his Stomach; *by Dr.* J. Wallis. *n.* 219. *p.* 178.

XII. My Son (Mr. *J. Wallis*, of *Soundeſs* by *Nettlebed* in *Oxfordſhire*) had a Horſe, which in Harveſt-time 1695, leaping over a Hedge, chanced to ſtake himſelf very dangerouſly. A Boy being ſent for him, rode home upon him about 4 o'Clock, without diſcerning the Hurt, till (upon his alighting) he found his own Legs bloody, and then diſcerned the Wound, ſomewhat behind the Fore-Legs, a little inclining to one Side. When the Farrier (*Tho. Biſhop* jun. of *Wallingford*) came, which was not till after 10 o'Clock that Night, he ſearched the Wound; and after he had enlarged it in the outward Skin and Rim of the Belly, he found a Wound in the *Ventricle*, or *Maw*, at leaſt 3 Inches long: He then removed the *Maw* outward, and ordered a Servant to cleanſe it from the chewed Graſs, and whatever he found in it, as being leſs likely to gangrene when empty. The *Maw* being thus cleanſed, the Farrier ſewed up the Wound therein, and then thruſt it back into the Body; and then ſewed up the Wound in the Rim of the Belly: The Wound in the outward Skin he did not ſew up, but only tacked it looſely together about the Middle, leaving Room on both Sides to put in Tents and Medicines for the healing of it. The Horſe after this continued for ſome Time much indiſpoſed, but in a Month or ſix Weeks Time (with careful Attendance) the Wounds were cloſed and perfectly cured; and the Horſe worked at the Plough and other Services as before.

A Knife cut out of the Stomach; *by Mr.* Will. Clerk. *n.* 250. *p.* 97.

XIII. Amongſt the Rarities in the *Anatomy-Hall* at *Leyden*, there is preſerved a Knife, 10 Inches in Length, which was cut out of a Peaſant's *Stomach*, and he lived 8 Years after.

A Knife ſwallowed by a Lad in Saxony; *by* — *n.* 219. *p.* 280.

XIV. *Jan.* 3. 1691, one *And. Rudloff*, a Country Lad, near *Hall* in *Saxony*, about 16 Years of Age, playing Tricks, with a Knife in his Mouth, it accidentally ſlipped down his Throat into his *Stomach*. The Knife was in all about 6¼ Inches long with a Harts-horn Haft: The Curioſity of the Caſe did oblige M. *Wolfgang Chriſt. Weſenern*, Phyſician to the *Elector* of *Brandenburg*, to take Care of him. The Knife was felt to have changed its Poſition ſeveral Times; and after a few Months, ceaſed to be very troubleſome, and in about a Year was ſo much diminiſhed, as to be difficult to be felt from without. Not long after, an angry Tumour, with Inflammation,

flammation, broke out 3 Fingers Breadth below the Pit of the *Stomach*, which being ripened, the *Apoſthem* was opened *May* 24, 1692; and being kept open, the Point of the Knife firſt appeared thereat, *July* 18 following. The Point they faſtened with a Silk-Thread, and the Wound being widened, the Knife was drawn out thereat *Aug.* 2. (a Year and 7 Months after it had been ſwallowed) and, in a little Time, the Lad was perfectly well. The Knife was exceedingly conſumed in all its Dimenſions.

Two Copper-Farthings ſwallowed by a Child in Worceſter; *by Mr.* Hen. Underhill. *n.* 246. *p.* 424.

XV. About 10 Years ago, my Son *Will. Underhill*, aged about 3 Years, ſwallowed by Accident two Copper-Farthings, but Half a Year one after the other. Upon the firſt Farthing, he eat nothing for 10 Days, and complained of a great Pain at his *Stomach*, and driveled as if he had been Salivated; and often ſaid, he had a nauſeous, venomous Taſte in his Mouth, the Farthing not coming from him in Half a Year. After the ſwallowing of the ſecond Farthing, he began by Degrees to loſe his Limbs, his Breaſt growing narrow, and the Child conſumptive; who was after perfectly cured by the *Bath*, and his Breaſt dilated and grew broad as before.

A Diſeaſe cauſed by ſwallowing Stones; by Sir Ch. Holt. *n.* 253. *p.*190.

XVI. 1. In *Feb.* or *Mar.* 169$\frac{2}{3}$, one *Tho. Gobſill*, of *Shelden* near *Coleſhill* in *Warwickſhire* (a lean, ſpare Man, aged about 26 or 27) told me, that about 3 Years before, he was extreamly tortured with Wind: And one Day making a Complaint to an old Woman in the Neighbourhood, ſhe adviſed him to ſwallow round white Pebbles, which he did as oft as he had Occaſion; and the Stones paſſing eaſily through him, he found great Relief. But after ſome Months, being ſeized with a violent Fit, he ſwallowed as uſually about 9 Stones; which not paſſing he repeated the Doſe, till he had taken above 200. He had theſe Stones in him above 2 Years and a Half, when he firſt came to me, and then complained that his Appetite was gone; that he could digeſt nothing, but threw up every thing he eat. Upon examining his Belly, I found the Stones lay almoſt as low as the *Os Pubis*; and thruſting my Fingers juſt above that Bone, ſo that the lower Part of the *Abdomen* might lie on my Hand, I could, with the Motion of my Hand, ſhake them and make them rattle, as if they had been in a Bag. Hereupon I cauſed a Ladder to be ſet againſt a Wall, and hung him up by the Hams upon it, with his Head downwards; when in this Poſture, he told me the Stones were got up to his *Stomach*; but being ſet down upon his Feet, after a very ſmall Time, we could plainly hear the Stones drop diſtinctly one after another.

If his Body be not *laxative*, he vomits all he eats or drinks; to prevent which he commonly keeps it open with Whey. As he lies in Bed, the Stones will ſometimes get up (as he expreſſed it) almoſt to his *Heart*, and give him great Diſturbance; at which Times he is forced to get upon his Knees, or to ſtand upright, and then he can hear them drop, as is before-mentioned; and at ſuch Times he can always count above 100. He is ſo diſabled by theſe Stones, that he cannot work but in Pain, and then he finds the ſame Night, and the next Day, a great Soreneſs in the Bottom of his Belly, and voids large Quantities of Blood by Stool. He has been under the Hands of ſeveral Quacks: Some had vomited him with *Stibium*, and purged him; others purged and glyſtered him; but all the forcing Medicines they made uſe of, could never bring one Stone from him.

Remarks on it, by Dr. Sloan. *Ib. p.* 192.

2. Some People (who ſee Birds languiſh, unleſs they ſwallow Gravel or ſmall Stones) take up an Opinion, That the ſwallowing Stones helps the *Stomach* to digeſt their Food: But I have been always againſt this Practice; becauſe though the *Stomachs* (or *Gizzards*) of Birds (they wanting Teeth to grind their Food) are made very ſtrong, muſcular, and defended in the Inſide with a Coat, by the Help of which, and theſe Stones, their Victuals are ground; yet the *Stomachs* of Men being very different, 'tis not reaſonable to think they ſhould be of Uſe to them. I knew one Mr. *Kingſmill*, who uſed to ſwallow for many Years (if I remember right) nine at a Time once every Day, without any Injury. They were near as large as Walnuts, roundiſh and ſmooth, and he found they always paſſed: But afterwards he died ſuddenly.

Prune-Stones breaking out at the Navel; by Mr. Greenhill. *n.* 265. *p.* 617.

XVII. Sir *Fran. Butler*'s Lady being ſurprized with a large and painful Tumour of the *Umbilicus*, conſulted Dr. *Eeles* and Mr. *Knowles* about it. After ſome Time, it broke of itſelf, and diſcharged a great Quantity of Prune-Stones; and notwithſtanding all the Care could be taken of it, ſhe died in about 20 Days.

A ruſty Needle breaking out at the Side; by Mr. Greenhill. *Ib.*

XVIII. A Servant to Sir *Anthony Keck* complained of a Pain and Hardneſs of his Right Side, which had continued more or leſs for 12 Years, and was obſerved to approach daily nearer the Skin. I made an Inciſion, and plucked out a ruſty broken Needle with my *Forceps*, which he thought he might have formerly ſwallowed. It ſtuck in a manner ſo firm in the Fleſh, as if it had been fixed in Wood, ſo that it could not be extracted without ſome Violence, and a ſmall *Hæmorrhage*.

The Glandulæ Miliares; *by Dr.* M. Liſter. *n.* 95. *p.*6062.

XIX. The *Glandulæ Miliares* of the *ſmall Guts*, which may alſo in ſome Animals be well called *Fragi-formes*, from the Figure of the one Half of a Strawberry, I take to be *excretive Glandules*, becauſe *conglomerate*.

A Bed of Glands in the Stomach *of a Jack; by Mr.* Muſgrave. *n.* 162. *p.* 699.

XX. *Aug.* 19, 1684, Mr. *Muſgrave* took Notice, in the *Stomach* of a Jack, of a large Bed of *Glands*, making about $\frac{3}{8}$ of the Inſide of the *Stomach*, and ſeated near the *Pylorus*. The whole Bed appears of a Browniſh Red Colour, and is divided into ſeveral Ridges, which run parallel to one another, and the ſame Way with the *Stomach*. For the better Contraction of that Part, eſpecially when empty (at which time theſe *Glands*, being fixed to the inmoſt Coat, are, together with it, drawn up into Wrinkles) that Edge of this Bed of *Glands*, which is neareſt the Head of the Fiſh, is dented, the Ridges breaking off on a ſudden; but at the other End, a little on this Side the *Pylorus*, they diminiſh almoſt inſenſibly. By theſe *Glands* he ſuppoſes at leaſt a conſiderable Share of the *Menſtruum* (the great Efficacy of which makes this Fiſh a fit Subject to illuſtrate the Nature of *Digeſtion*) is ſeparated from the Blood; for Blood Veſſels may be ſeen in great Numbers, on the other Side of the *Glands*, and inner *Tunic*, by ſeparating it and them from the Middle and Muſculoſe *Tunic:* And, as a farther Argument of this Uſe of theſe *Glands*, he has obſerved, that that Part of the *Stomach* where they are, is generally moiſter than the other Part near the Mouth; and that in diſſecting Jacks whoſe *Stomachs* have been filled with ſome large Fiſh of the Pinnaceous Kind (which muſt enter with the Head foremoſt) the Head and fore-moſt Parts of the devoured Fiſh have, as far as the *Glands* reach, been either actually diſſolved or fairly turning into a Mucilage; whereas, at the ſame time, the other, and leſs bony Part of the included Fiſh, being not yet come within the Power of the *Menſtruum*, has ſtill retained its Form and Conſiſtence.

Explication of the Figures. *Fig.* 13.

Figure 13, repreſents the Inſide of the *Stomach* of a Jack which was one Foot and 8 Inches long; the *Stomach* itſelf, about 8 ½ Inches. *A A A A*, the Bed of *Glands*. *B B B B*, that part of the inward *Tunic*, which reaches from the Bed of *Glands* to the Mouth of the Fiſh: It appears much whiter than the *Glands*; the Fibres run the ſame way with the *Stomach*. *C*, the Entrance into the Paſſage which leads to the *Bladder* of Air. *D*, the *Pylorus*. *E*, the Hollow of the *Stomach* continued beyond the *Pylorus*.

Fig. 14.

Figure 14, repreſents the other Side of the Bed of *Glands*, ſeparated together with the inner from the middle *Tunic*, and great Numbers of *Capillary* Veſſels belonging to the *Glands*, but broken off in Separation.

Experiments concerning Digeſtion; *by Mr.* Ch. Leigh. *n.*162. *p.*694.

XXI. 1. I here give you an Account of an *Artificial Digeſter*, which I hope may ſomething illuſtrate the Natural One. The Taſte of it is like Meat vomited out of a full *Stomach*, ſomething ſoure, but will not ferment with an *Alkali*. It is prepared from *Spirit* of *Sulphur*, *Spirit* of *Hartſhorn*, the *Chyle* of a Dog, and the *Saliva:* It is Pellucid, and without any Smell; the *Salt* that it ſhoots into is *Cubical*. Upon Veal it afforded theſe *Phænomena:* Into a *Dram* of this Liquor I put a Piece of Veal about the Bigneſs of a Nut, and ſet it upon a digeſting Furnace; in two Hours Time there came from the Meat a Liquor that had the Colour and Taſte of *Chyle*, and the Meat afterwards was lighter, dry, and inſipid. And it afforded the ſame *Phænomena* alſo in Beef, Mutton, or any other Meat that I could meet with. From theſe Obſervations we may reaſonably conjecture, That by ſome ſuch *Menſtruum* the Meat is *digeſted* in the *Stomach*.

I would not here be thought to affirm, That by a *Liquid Menſtruum* alone the Meats are *digeſted*, but that there are likewiſe required theſe further Requiſites, in ſome, or in moſt Creatures. 1. That the *Stomach* receive a gentle Heat from the *Liver*. 2. That the *Stomach* have a natural Situation. 3. That it be aſſiſted by the *Omentum*. This may be argued from thoſe Creatures that have no *Caul*, helping *Concoction* by doubling their hinder Legs, and reſting their Bellies upon them, as *Hares* and *Conies*.

4. That the *Stomach* have a *Tunica Villoſa*; 1. Becauſe that by that it is enabled to divide the Meat into Parcels, which undoubtedly muſt much facilitate the Operation of the natural Ferment. 2. If it had not a *Tunica Villoſa*, the *Tunica Carnoſa* would be apt to be too much diſtended by our Meat and Drink, which would neceſſarily weaken the Tonical Motion of the *Stomach*. 5. That there be *Windings* of the *Inteſtines*; for if it were not for theſe, the *digeſted* Meat would move too faſt from the *Stomach*, and ſo torment us with perpetual *Hunger*.

Pharm. Ration. p. 6.
Syl. de la Boe. p. 881.
Mayow, *p* 55.

The *Ingredients* of the *Natural Ferment* I take to be theſe; the *Saliva*, the *Succus* of the *Glands* of the *Stomach*, and a *Nitro-Aerial Spirit* of the *Nerves*. That the *Saliva* is an Ingredient, may ſeem probable from theſe Reaſons; 1. Becauſe that by the Help of this, Meats, though impregnated with different Principles, may be made to mix with a *Menſtruum*. 2. Since the *Saliva* is impregnated with a volatile Salt, it is probable, that that too may help *Digeſtion*. The ſecond *Ingredient*, I take to be a Liquor that is ſeparated by the *Glands* in the Bottom of the *Stomach*: For, beſides the Authority of the famous *Willis*, and *Sylvius de le Boe*, it is obſerved, that thoſe Creatures which have the moſt of theſe *Glands*, are the moſt voracious. *Laſtly*, That the *Nitro-Aerial Spirits* of the *Nerves* are an *Ingredient* of the Stomachical Ferment, ſeems reaſonable from the Arguments of Dr. *Mayow*, who argues thus: *Jam vero cum Spiritus Animales è Particulis* Nitro-aereis *conſtant, haud difficile erit intellectu quomodo Effectus prædicti ab iiſdem in* Ventriculo *perficiuntur. Quanquam enim Spiritus* Nitro-aereus Acidus *non eſt, ab eodem tamen Ferrum corroditur,* Vitriola *perficiuntur, Salia* Fixa *ad Fluorem perducuntur, Rerumque Compages tanquam ab* Univerſali Menſtruo *ſolvuntur.*

By Mr. Muſgrave, *n.* 162. *p.* 699.

2. *Aug.* 19, 1684. Part of a Mucous Subſtance taken out of the *Stomach* of a Jack, near the *Pylorus*, and mixed with *Solution* of *Sublimate*, became much whiter than it was before. Another part of it, mixed with *Syrup* of *Violets*, turned Green.

The like Effects were obſerved by mixing a Liquor, found in the *Stomach* of a Hedge-hog, with *Syrup* of *Violets*, and with *Solution* of *Sublimate*.

Theſe Experiments may be urged as an Argument againſt the Exiſtence of an *acid Ferment* in the *Stomach*. It ſeems probable, that the great Work of *Digeſtion* proceeds from a *volatile Alkali*.

The Manner of Concoction; *by Dr.* Clopton Havers, *n.* 254. *p.* 233.

XXII. It has been the Opinion of ſome Phyſicians, That the *Concoction* of the Food is a kind of *Elixation*, and that the groſſer and more ſolid Parts being as it were Boiled in the Liquid by the Heat of the *Stomach*, and the Parts adjacent to it, as the *Liver*, *Spleen*, and *Omentum*, are by a long and continued *Elixation* firſt rendered more tender, and then colliquated and diſſolved into minuter Particles, ſo as to mix more equally with the Fluid, and with that to make one Pulpament, or *chylous Maſs*. Others have ſuppoſed it to be performed by *Attrition*, as if the *Stomach*, by thoſe repeated Motions, which are the neceſſary Effects of Reſpiration, when it is diſtended by the Aliment, did both rub or grind off ſome minuter Particles from the groſſer Parts, and by continually agitating the Maſs of Food, make thoſe Parts, which are not contiguous to the *Stomach*, ſtrike one againſt another, and break one another in Pieces, until they are all attenuated. Others think that the *bilious Juice*, others, that the *Spirits* are chiefly concerned in this *Affair*. Others there are that will have the Food *diſſolved* by a *Menſtruum*, which is ſupplied from the *Glands* of the *Stomach*, or ſome other way: But theſe differ in their Notions of the Nature of the *Menſtruum*; for there are ſome that ſuppoſe it to be an *Acid*, which does erode the groſſer Parts of the Food, and diſſolves them in the ſame manner as *Vinegar*, *Spirit* of *Vitriol*, or any ſuch like *Acid*, will diſſolve even ſo ſolid a Body as Iron. And it cannot be denied, but that *Oil* of *Vitriol* will diſſolve Fleſh-meat, and reduce it to a Pulp. But it is not to be ſuppoſed, that the Fibres of the *Stomach* can admit any ſuch ſtrong and corroding *Acid*, without ſomething to correct it, but it muſt be injured in its Tone, and labour under great and extraordinary Pains. Neither does ſuch a *Menſtruum*, though it will digeſt ſome Things, ſeem capable of diſſolving ſo great a Variety of Things as we eat, eſpecially when a great many of them are of a contrary Nature. Some will have the *Menſtruum* to be a *Nitro-aereous Spirit*, that is quick, and very penetrating, and included in its proper Vehicle; which, being in its own Nature apt to penetrate the Maſs of the Aliment, does diffuſe itſelf through the whole, and breaking the *Vinculum* of the moſt ſolid Parts, does diſſolve their Compages. By others it is thought to be ſome *ſaline Juice* in the *Stomach*, by which the Parts of the Aliment are divided and diſſolved, and thoſe which are fit for Nouriſhment are volatilized. *Laſtly*, There are ſome who ſuppoſe the *Digeſtion* of the Food to be performed by the Benefit of a *Ferment*, which, when it is mixed with the Aliment, excites in the Maſs an inteſtine Motion, and the different and contrary Motions or Tendency of the Parts, making ſome kind of Colliſion, gradually break off Particles from the groſſer and more ſolid Parts, till they are ſo attenuated as to be apt to mix more equally with the fluid, and with them to make one ſoft, or *chylous* Subſtance. But theſe alſo differ in their Opinion of this *Ferment*: For ſome think it to be the *Remains* of the *Food* that was laſt *digeſted*, which having lain ſome Time in the *Stomach*, after the reſt is carried down into the *Inteſtines*, contracts an *Acid*, or ſome other Quality, and is ſo altered as to partake of the Nature of a *Leaven*. And this *Leaven* being a part of the Food, which has been already *digeſted*, is ſo ſoft and liquid as to be capable of mixing with the Aliment which is next taken into the *Stomach*, and being agitated with it by the repeated Preſſures of the *Diaphragm*, *Liver*, and *Abdominal Muſcles*, upon the *Stomach* in Reſpiration, does diffuſe itſelf through the whole Maſs, and being mixed with it like *Leaven*, or Yeaſt added to new Wort, *&c.* puts it into a State of *Fermentation*, and by this *Fermentation*, or the Expanſion of the *Ferment*, and the more tenuious Parts, which are firſt put into Motion by it, thoſe which are more ſolid, and with which they are intermixed, are rent and divided, and ſo attenuated as to become a ſoft and pulpous Matter. And although the greateſt Part of the Food, that is thus broken and concocted, is by the Contraction of the Fibres of the *Stomach* preſſed into the *Duodenum*, yet they do not contract themſelves ſo as to force out all the Aliment, but leave between the *Rugæ* or Folds on the Inſide of the *Stomach*, a ſufficient Quantity to be a *Leaven* to the next Meal; and ſo from Time to Time. Some have a Notion, That this *Ferment*, or Principle of *Fermentation*, is in the Aliment it ſelf; which being a Congeries of Matter, conſiſting of various Parts of a different Nature, is no ſooner incloſed in the *Stomach*, and digeſted in the Heat of that and the adjacent Parts, but the more ſpirituous and ſubtile Particles are put into Motion, both from that Warmth and the Difference of their Natures, and enter upon a *Fermentation*; and ſo by their inteſtine Commotion, and the Violence they offer to thoſe Parts which oppoſe the Tendency of any of them, they break and diſſolve what is more ſolid. Again, ſome ſuppoſe, That this *Ferment* is ſupplied from the *Glands* of the *Stomach*. And *Laſtly*, others, and perhaps with much better Reaſon, contend for the *Saliva*, and make that to be the *Ferment* which ſerves principally for the *Digeſtion* of the Food; which in *Maſtication* being mixed with our Aliment, is with that carried down into the *Stomach*, where the Parts of it being put into Motion by a kindly and agreeable Heat, they do *ferment* with, and exagitate firſt thoſe Parts of the Food which are moſt apt to *ferment* with it, then both conſpire to break and diſſolve the groſſer and more ſtubborn Parts.

But according to my *Hypotheſis*, *Concoction* is performed after this Manner: In order to the more eaſy and effectual *Digeſtion* of the Food, Nature has appointed ſome Parts for the breaking our Aliment, and reducing whatever is groſs into ſmaller Parts, before it is put upon *Digeſtion*: Others, to ſupply the *Ferment* by which it is to be diſſolved and concocted, and which, before it comes to be included in the *Stomach*, does moiſten, and make it more ſoft, that it may more eaſily be penetrated and broken by thoſe Parts which ſerve to divide every Morſel into ſmaller Pieces, and prevents the Inconvenience and Trouble which would ariſe from the Nouriſhment ſticking about, or between them, when it is dry or viſcous.

For the Breaking of that Part of our Food which is not liquid, Nature has furniſhed us with *Teeth*, and thoſe of two Sorts: For ſome are ordained to divide and break off ſmaller Morſels from a larger Maſs; others are made for the Grinding thoſe Morſels into much ſmaller Parts. The *Teeth* which ſerve to break off Pieces of a convenient Magnitude from a larger Maſs, are of two Sorts, accommodated to the Nature of the Subſtance which we eat. Theſe are the *Inciſores*, and the *Dentes Canini*. If the Subſtance which we have to eat be not hard, but more eaſily penetrated and divided, then the *Inciſores* are capable of making an Impreſſion upon it, and fixed firmly enough in the *Jaw* to break off that Part which they take hold of. But if it be more ſolid, and not eaſily penetrated, nor any Piece without Difficulty to be ſeparated from that Body whereof it is a Part, then we apply the *Dentes Canini*, or *Eye-Teeth*, to it, which are not ſpread, nor have ſuch an Edge as the *Inciſores*, but are ſharp and pointed like an

Awl, and ſo do more readily penetrate a Subſtance that is hard, and which the *Inciſores* can ſcarcely make any Impreſſion upon. And as the Parts of a more ſolid Body are commonly with more Difficulty ſeparated, and there muſt be a greater Streſs put upon thoſe *Teeth* which pull it into Pieces, ſo theſe *Teeth* are much more firmly fixed in the *Jaws* than the *Inciſores*, though they have but one ſingle Root. Beſides, the Poſition of all theſe *Teeth* is accommodated to their Uſe, as being planted oppoſite to the Aperture of the Mouth, ſo that they may be conveniently applied to the Subſtance which we have to eat before it is broken, and when it is too large to be admitted within the Mouth. The *Teeth* which do by a Compreſſion and Attrition reduce the little Morſels to ſmaller Parts, are, from the Manner in which they break the Aliment, called *Dentes Molares*, becauſe they do, like ſo many little Mill-ſtones, grind the Food between them. And that they might be rendered fit for this Purpoſe, they are made broad at that Extremity which ſtands out of the *Gums*, by which Means they retain ſome Quantity of the Food between them every Time the *lower Jaw* is pulled up and forced againſt the *Maxilla Superior*. And as they are Broad, ſo they are formed with Inequalities and Protuberances, and by the Motion of the *lower Jaw*, from one Side towards the other, they grind what they have between them into Pieces. The Poſition of theſe *Teeth* too is as convenient as that of the *Inciſores*, and the *Dentes Canini*: For being deſigned to break thoſe Pieces of our ſolid Food which are taken into the Mouth, and theſe Pieces when they are compreſſed and moved by the *Dentes Molares* being apt to fly out of the Mouth, if there were no Contrivance to prevent it, they are placed beyond the Aperture of the Mouth, and oppoſite to the Cheeks, which keep the Food within that Cavity; and not only ſo, but preſs it in between the *Dentes Molares* on one Side, as the Tongue does on the other, until they have ſufficiently broken and divided it.

At the ſame Time, whilſt the *Dentes Molares* are breaking the Food, there flows into the Mouth a *ſalival Juice* which mixes with it, and not only ſerves to moiſten it, and to render it more apt and eaſy to be divided, but ſeems to be the *Ferment*, by the Benefit of which the Food is diſſolved and *digeſted*: And therefore it is intimately mixed with it by the *Teeth* agitating or ſtirring them together in *Maſtication*. This Liquor, which we commonly call the *Saliva*, or Spittle, ſeems to be a Compoſition made of two ſeveral Juices, very different in their Nature. And therefore the ſeveral Parts of it are ſeparated by their proper *Glands*, and Nature has planted no fewer than 4 Pair about the Mouth, which ſupply the Juices that make the *Saliva*; to wit, the *Parotides*, and the *Glandulæ Nuckianæ*, the *Glandulæ Maxillares Internæ*, and *Sublinguales*. Of theſe two *Juices*, I think one to be an *acid*, the other an *oleaginous Liquor* ſomething like *Oil* of *Turpentine*. For amongſt many Experiments this gave me moſt Satisfaction: I took a Piece of raw Fleſh, and having cut it into pieces, but much larger than what our more ſolid Food is reduced to by due *Maſtication*, I mixed ſome Crumbs of Bread with it; then I poured in *Oil* of *Turpentine* to them, and upon that *Oil* of *Vitriol*, and having ſhaked them together, I digeſted them about 4 Hours in *Balneo Mariæ*,

riæ, and then ſhaking them again in the Glaſs, I found the Meat diſſolved, and they all became a thickiſh Pulp. I could not but take Notice, that *Oil* of *Camphire* (though it does not otherwiſe ſeem much different in its Nature from *Oil* of *Turpentine*) and *Oil* of *Vitriol*, which upon Mixture will produce an Effervеſcence as well as the *Oil* of *Turpentine* and *Oil* of *Vitriol*, yet did not touch the Meat upon which I poured them, ſo as in the leaſt to diſſolve them. I cannot deny, but that an *Acid* and a Solution of *Salt* of *Tartar* did diſſolve ſome Part of the Fleſh Meat, which I mixed them with, but yet neither ſo ſoon nor ſo perfectly as the two fore-mentioned *Oils*. And I do the rather think one of thoſe *Juices*, which conſtitute the *Saliva*, to be of the Nature of *Oil* of *Turpentine* than of *fixed Salt*, becauſe it will correct and temper even *Oil* of *Vitriol*, ſo as to render it more tolerable to the Fibres of the *Stomach*. Not that I ſuppoſe the *acid* Part of the *Saliva* to come near to the Acidity of *Oil* of *Vitriol*: For though when they are mixed, they will make a Liquor that may not be injurious to the *Stomach*, yet the *acid Juice*, if it were ſo corroſive as *Oil* of *Vitriol*, would certainly be injurious and painful to the *ſalivatory Ducts*, which convey it to the Mouth before it is mixed with the *oleaginous Liquor*. But I only ſay, it is an *Acid*, and in ſome Degree approaches to the Nature of that *Oil*.

I do alſo conceive, that 4 of the 8 *ſalivatory Glands*, or 2 Pair of the 4, do ſupply one of theſe *Juices*, and the other 4 *Glands*, the other. And this ſeems to be a very good Reaſon why they are ſo planted, and the Orifice of their *Ducts* ſo ordered, that the *Juice* which is ſupplied by one *Gland*, is diſcharged into the Mouth very near to the Orifice by which the Juice of a different Nature is tranſmitted from another; ſo that they muſt neceſſarily meet and mix together. Thus the *Glandulæ Nuckianæ* and the *Parotides* throw in two different Juices by Orifices which open into the Mouth very near to one another, and the *Glandulæ Maxillares Internæ* and *Sublinguales* do below ſupply the ſame Kind of Juices by Orifices, that open ſo near to one another as to ſecure the Mixture of the two different Juices. Theſe *Glands*, I ſay, do between them afford two divers Sorts of Liquors, of ſuch a Nature as are apt to *ferment* upon their firſt Mixture, but perhaps more conſiderably when they come to be digeſted by the Heat of the *Stomach*. So that the *Colluctation*, or *Fermentation*, which attenuates and concocts the Food in the *Stomach*, does not ordinarily ariſe between the *Aliment* and the *Saliva*, but between the ſeveral Parts of the *Saliva* it ſelf. And indeed if the *Saliva* did not conſiſt of two Juices whoſe Nature is in ſuch a Manner different, as to render them apt to *ferment* upon their Mixture, it would be very hard to conceive how it ſhould ſo readily and indifferently ſerve for the *Digeſtion* of all Eatables; how it ſhould ferment with, and diſſolve ſo great a Variety of Things, not only of a different, but of a contrary Nature; how it ſhould ferment with *Acids* as well as *Alkalies*; digeſt Things that are cold as well as hot or temperate; ſome Things that are ſalt, others that are inſipid; bitter and ſweet; mucilaginous, oily, *&c.* But if we ſuppoſe that the *Fermentation* which ſerves for the Digeſtion of the Food, ariſes from a peculiar Difference in the Nature of two Juices which conſtitute the *Saliva*, it will be eaſy to give a rational Account of our *Concoction* of innumerable Things of a different Nature. And this ſeems to be as effectual, and a more certain Way to attenuate and diſſolve the groſſer Parts of our Food, than if the *Fermentation* were made only between the *Saliva* and the *Aliment:* Beſides, the *Saliva* ſeems to diſcover a *Fermentation* upon the Mixture of its conſtituent Juices, even at thoſe Times when we do not actually eat; for it is always attended with Bubbles, and a Froth, when it has not been at all agitated in the Mouth, and many of thoſe Bubbles will remain for ſome conſiderable Time after we have ſpit it out.

Nature therefore having appointed the *Saliva* for the *Digeſtion* of the Food, has taken Care that it ſhall be thrown in upon the *Aliment* on every Side. Thus the *Glandulæ Nuckianæ* and the *Parotides* ſupply their Juices to that Part of the Food which lies on the Outſide of the Gums, between the Cheeks and the Teeth, and the *Glandulæ Maxillares Internæ* and *Sublinguales* do beſtow their Liquor upon the Meat which is within the Teeth and Gums. She hath alſo had a Regard to the Mixture of the two different Juices of the *Saliva*, which is neceſſary to its *Fermentation:* And therefore, as I have already obſerved, the Orifices of the *Ducts* which belong to one Sort of *Glands*, are placed near the Aperture of a *Duct* which conveys a Juice from one of the other *Glands*. So the *Ducts* of the *Glandulæ Nuckianæ* and the *Ductus Stenoniani* do on each Side open into the Mouth near one another; and the *ſalivatory Ducts* of the *Glandulæ Sublinguales* and the *Maxillares Internæ*, though they have diſtinct Orifices, empty themſelves under the ſame *Papillæ* ; and the Juices, which are ſupplied by them, meet there and flow into the Mouth together. The *Saliva* being thus mixed, and beginning a *Fermentation*, does partly as it is agitated with the Food by the Teeth and ſome other Parts of the Mouth, partly by its own Fluidity, inſinuate its ſelf into, and mixes with the Food, and not only moiſtens and ſoftens it, but excites the *Fermentation* which is to diſſolve it. And when the *Aliment* is thus mixed with the *Saliva*, which ſerves to *ferment* the whole Maſs, it is then conveyed into the *Stomach*, that great digeſtive Veſſel of the Body, where it is kept in a *digeſtive Heat*, and the *Fermentation* not only continued but improved. This *Fermentation* in the *Stomach*, firſt agitates the more tenuious or ſubtile Parts of the Food, and puts them into Motion, and ſo with the *Fermentation* of its own, and thoſe alimentary Parts which it firſt communicates a Motion to, improved by the *Heat* of the *Stomach*, the *Saliva* muſt neceſſarily act upon the groſſer Parts. For the inteſtine Motion which is excited in the Maſs, does not give the Particles which are fermented the ſame Tendency, but what is ſo various and confuſed, that they muſt inevitably ſtrike not only one againſt another, but againſt thoſe which are more groſs, ſo as to attenuate them, ſometimes by a Colliſion, which ſtrikes off ſmaller Particles from the larger Parts; ſometimes by a Compreſſion, when the Particles, which are in Motion, happen to ſtrike directly againſt any groſſer Part on every Side of it; ſometimes by a kind of Exploſion: For without Doubt, the *Saliva*, which is fluid, inſinuates itſelf into the *Interſtices* of the more groſs Parts of the *Aliment*; and whatever is agitated or expanded in thoſe *Interſtices*, requiring a larger Space for the Freedom of its Motion, and offering a Violence to every thing that oppoſes its Tendency, will, like Gunpowder included in a Shell, force its Way out, and tear to Pieces that Matter which does endeavour to confine it. Thus the groſſer Parts are broken and divided, until they are at laſt ſo far attenuated, as to mix more equally with the fluid, and with them to make one Pulp, or *chylous* Maſs. And although I do not apprehend how the *Stomach* ſhould, by its reciprocal Motions, in Inſpiration and Expiration, be able to break and attenuate any Matter that will not be ſoftned and diſſolved by Agitation in a Liquid; yet it is certain, that theſe Motions cauſed by the *Diaphragme* and *Abdominal Muſcles* in Reſpiration, do make thoſe Parts which are broken off, as they are diſſolved, mix more intimately with the Liquid, as the Meat, which I digeſted with *Oil* of *Turpentine* and *Oil* of *Vitriol*, did, by Agitation, mix more equally with the *Oils*, and became a Pulpament.

It is further probable, that from the Mixture of the two *Juices* of the *Saliva*, and their *Fermentation*, there reſults ſuch a *Tertium quid* as is apt to ferment with the *Bile*. And therefore, when the *Aliment* has been under the *Fermentation*, excited by the *Saliva*, a ſufficient Time, it is then thrown into the *Duodenum*, where it meets with the *bilious Juice* which flows into that Inteſtine from the *Liver*, from which a new *Fermentation* ſeems to begin; and the Commotion of the Parts of the *Aliment* being ſtill continued, does carry on the Buſineſs of the *Digeſtion*, until the Food is perfectly concocted. Though it is probable, that this new *Fermentation* ſerves not only for the more perfect *Digeſtion* of the Food, but likewiſe for the Separation of the *Chyle* from the *fæculent* Parts. And I was confirmed in the Opinion, that from this Mixture and *Fermentation* of the two *Juices*, which conſtitute the *Saliva*, there reſults a Matter which is apt to ferment with the *Bile* by this Experiment. The *Bile* being generally allowed to have much of a *ſaponary* Nature, I made a Solution of *Soap* in fair Water, and mixed it with the *Oils* of *Turpentine* and *Vitriol* firſt put together, and from their Mixture, I obſerved a very eaſy and gentle *Fermentation*, which continued for a conſiderable Time.

The Colour of the Chyle *in the* lacteous Veins; *by Dr.* M. Lyſter. *n.* 95. *p.* 6060.

XXIII. 1. It hath been long in my Thoughts and Deſires, to have diſcovered the actual Paſſage of the *Chyle* into the *lacteous Veins*; of which yet I never doubted, as I find ſome do at this Day. The Difficulty lies in the certain and unalterable Character of the *Chyle*'s *Whiteneſs*, eſpecially when received into thoſe *Veins*. And yet it is certain, that in a *Diabetes* the Urine retains all the Qualities of the Liquor drank. Alſo in that famous Inſtance of thoſe that eat the Fruit called the *Prickle-pear* (if I remember right) their Urine hath affrighted the Eater with the Colour of Blood, that is with the not altered Colour of the Juice of the Fruit. In theſe Inſtances, at leaſt, we cannot doubt but the *Chyle*, even in the *lacteous Veins*, was qualified according to the Food and Drink.

To effect then ſomething to this Purpoſe, we laced the Skin of the *Abdomen* of a Dog looſely for a Hand's Breadth; and then opening it underneath the Stitches, we took out either the *Duodenum*, or any other Part of the *Tenuia Inteſtina*. The *Gut* took out we opened with a very ſmall Orifice, and having ready Tinged Liquor luke-warm, we injected it upward and downward. Carefully ſtitching up the *Gut*, and then drawing the Lace, we unlooſed two of the Dog's Feet, laying him on his Side for what Time we thought convenient. The Tinged Liquors we uſed, were good *Barbadoes Indigo*, diſſolved in fair Water, and filtrated; alſo Lumps of *Indigo* thruſt down his Throat; good Broth (as they call it) of a blue Fat; *Indigo* in Milk; *Saffron* in Milk. Again, we tried in ſome Dogs fed before-hand, and injected the Liquors in the very Height of the *Chyle*'s Diſtribution; into others yet Faſting, and that for a longer or ſhorter Time. The Succeſs was ſo conſtant, that we cannot ſay we ever did find the leaſt Diſcolouring of the *Chyle* on the other Side of the *Guts*; that is, within the *lacteous Veins*, but ever *white* and uniform.

But the Succeſs of ſome latter Experiments was as follows: I cauſed a Dog to be fed, and after 4 Hours, or thereabouts, having ready by me a clear Tincture of *Indigo* diſſolved in fair Water, and filtred, I opened the *Abdomen*, and making a ſmall Inciſion in the *Jejunum*, I injected an Ounce or two. This done, we ſtitched up the *Gut* and all again, and the Dog turned upon his Legs. After one Hour and a Quarter, we cut the Stitches, and then beheld a copious Diſtribution of *Chyle* and turgid *lacteal Veins*, but as *white* as ever. And yet carefully ſearching the *Guts*, we perceived none of the injected Liquor any where. Another Dog, which was kept Faſting 40 Hours, had a very little Fleſh without Water given him about 5 Hours before the Injection of the Tincture of *Indigo*, which was performed after the ſame Manner as before, only it was now well warmed, and about 12 Ounces thrown up the *Duodenum*, and down the *Ileon*. Here were empty *Guts*, and not the leaſt Appearance of any *lacteal Veins* in the *Meſentery*. After full 3 Hours, the Stitches were cut again; and carefully examining the *Meſentery*, we found many *lacteal Veins* of an *Azure* Colour, and cutting ſome of the biggeſt of them aſunder, we plainly ſaw a thick *bluiſh Chyle* to iſſue forth, and to ſpread itſelf over the tranſparent Membranes of the *Meſentery*. Hence it is moſt evident, that the *Lacteal Veins* receive what they carry from within the Cavity of the *Inteſtines*. *n.* 143. *p.* 6.

The Lacteals *frequently convey Liquors that are not* white; *by Dr.* William Muſgrave. *n.*166. *p.* 812.

2. I have found Dr. *Liſter*'s Experiment to ſucceed, by Injecting a Pint of a Decoction of Stone-Blue into one of the *Inteſtina Tenuia* of a Dog kept Faſting 36 Hours; which not only claimed my Aſſent to his Concluſion, that a coloured Liquor may find Admittance into the *lacteal Veſſels*, but alſo inclined me to an Opinion, that the *Lacteals* frequently convey Liquors which are not *white*. And I am more confirmed in this Opinion by Experiments of theſe three Kinds.

1. I kept 2 Dogs Faſting, one 48 Hours, the other 3 Days, and then opened them; in both a conſiderable Number (above 20 were feweſt) of the *Lacteals* appeared *pellucid*, like *Lymphaticks*; only not ſo full and tur-

gid as thoſe under the *Liver* are generally, or as the *Lacteals* themſelves are ſometimes ſeen. I cut ſeveral of them in each Diſſection, and immediately a *tranſparent* Liquor flowed out of the Orifice.

2. A Dog, which had neither eaten nor drank in 3 Days, was ſuffered to lap a Quart of common Water: An Hour after which he was opened, the *Lacteals* ſhewed themſelves in a great Number (perhaps above 60) all *limpid*, from the Liquor contained in them, as in the former Experiments: Part of the Water was ſuppoſed to be ſtill in the *Stomach* and ſmall *Guts*; for the Quantity of Water ſeen there, was far greater than that in the *primæ viæ* of either of the Dogs killed Faſting.

3. Another Dog, after three Days Faſting, had a Piece of fat Meat given him; an Hour and Half after which, he lapped about a Quart of common Water, and Half an Hour after this, was opened. I firſt tried the *Ductus Thoracicus*, then examined the *Lacteals*; which I ſaw in as plentiful a Number, and as full as (perhaps) they were ever ſeen in this Species of Animals. 8 or 10 of them, at the firſt opening of the Dog, appeared perfectly *white*, very many of a faint diluted *white*; but moſt of them were *pellucid*, eſpecially at the latter End of the Diſſection; by which Time ſeveral, which at firſt were either of a lively, or of a fading *White*, were now grown *tranſparent*. That I might ſatisfy myſelf as to this Difference in the Colour of theſe Veſſels, I opened the *Inteſtinum Jejunum* and *Ileon* in ſeveral Places, and found the Water was got as far as the *Cæcum*, and had carried down divers little Parcels of the Meat with it; by which Means the Liquor ſeen in the *Lacteals*, at the firſt View of them, was either of a perfect, or of a diluted *White*, or elſe *pellucid*, according to the Mixture of the Meat with the Water in the *Guts*.

I ordered about 3 Pints of Broth to be given a Dog, which had been kept Faſting 24 Hours; and opening him 4 Hours after this, I obſerved the *Lacteals*, beginning at the *Duodenum* (which, with the other ſmall *Guts* and *Stomach* was very much diſtended with the Matter of the laſt Meal) all the *Lacteals* that I ſaw at firſt were of a perfect *white* Colour; ſeveral of which I preſſed between my Fingers, drawing them from the Circumference toward the Center of the *Meſentery*; by which Means I found, that the *Chyle* contained in theſe Veſſels appeared *white*, when it ran in a ſhallow Stream, as well as when it filled the *Lacteals*. Viewing the reſt of theſe Veſſels along toward the *Cæcum*, I obſerved, that near the Middle of the *Inteſtinum Ileon*, they began to be of a more diluted *White*, and a little farther, they were really *pellucid*, and as turgid, to Appearance, as thoſe that were *white*; after which, turning back again toward the *Stomach*, I ſaw the ſame Veſſels (I think) in as great Numbers as at firſt (perhaps above 80) but the Colour of moſt of them was changed, for they were all now *pellucid*: Some 3 or 4, which I at firſt cut aſunder for my better Enquiry into the *white Chyle* contained in them at that Time, being *limpid* together with the reſt. The ſame Thing ſucceeded in a Dog kept Faſting two Days, and then opened 3 Hours after he had lapped 3 Pints of Milk, Part of which was ſeen in the *Stomach* of the Dog: About 15 of the *Lacteals*, ariſing from the *Duodenum* were *white*; above 100, proceeding from the *Inteſtinum Jejunum* and *Ileon*, were more or leſs *tranſparent*; as alſo were thoſe of the *Duodenum* at the latter End of the Operation.

The Experiments of the firſt Kind do ſufficiently prove, That the *Lacteals* convey not only *Chyle* (which reſults from *Aliments* lately taken into the *Stomach*, and may be called *Liquor Novitius)* but alſo another Humour ſeparated (as is moſt probable) from the Blood, and now returning to it again; which (by Means of the aforeſaid Experiments) may be ſeen purely by itſelf, without any Mixture of the *Chyle* with it. And it ſeems not unreaſonable to derive this *Liquor Refluus*, or at leaſt Part of it, from the Hollow of the *Inteſtines*, if we conſider that the *Pancreas*, and *Glandularum Plexus Fragiformes* (not to mention the *Liver)* do daily diſcharge a Liquor into the Inteſtines; which (conſidering that Dogs, after three Days Faſting, will, as I have often obſerved, have very hard *Fæces* in their *Inteſtina Recta)* we cannot well diſpoſe of any other Way, than by ſaying, it re-enters the Blood by the *Lacteals*, and is that very Liquor which conduces to the making ſome of them appear *tranſparent* after ſo long a Faſt. It ſeems alſo probable, from the ſame Experiments, that the *Lacteals* are very ſeldom, or never, all empty at the ſame Time; for tho' the *Chyle* flows only in certain Tides, or Flaſhes, *pro ratione Ingeſtorum*, yet the *Liquor Refluus*, running in a more conſtant Stream, does, when there is no Flaſh of *Chyle* going in, keep the *Lacteals* from being abſolutely empty. And 'tis farther evident, that this *Liquor Refluus* is, in its own Nature, *tranſparent*, and paſſes through the *Lacteals*, after long Faſting, when no *Chyle* is mixed with it; which is no inconſiderable Step to the making out of my Propoſition, if we recount how long, and how often, very many Quadrupeds, beſide Men, do faſt from all ſort of *Aliment*; during which Time, after the *Chyle* of the laſt Meal, or Time of Drinking, is all mixed with the Blood, we may ſuppoſe, that this *pellucid Liquor Refluus* goes alone into the *Lacteals*.

The Experiments, both of the 2d and 3d Kind, ſeem to intimate, that a great Part of the *Chyle* itſelf is, in its Journey through the *Lacteals*, altogether *limpid*. Againſt which it may be objected, That ſome of the *Lacteals* were in a like manner *pellucid* in all the Experiments of all the 3 Kinds; and therefore it does not appear, but that they may be filled with a *Liquor Refluus* in the 2 laſt Caſes, as well as (for certain) they were in the firſt Caſe. To this Objection, beſide what may be anſwered from the extraordinary Number, and Fulneſs of the *limpid Lacteals* in the two laſt Kinds of Experiments, comparing theſe Veſſels with thoſe of the ſame ſort ſeen in the firſt Kind (which comparative Exceſs cannot be imputed to any Cauſe ſo reaſonably, as to the Matter given the Dogs a little before the Diſſections of the two laſt Kinds.) Beſides this, I ſay, it may farther be replied, That in all the Inſtances of the 2d and 3d Caſes, a conſiderable Quantity of Aliment was taken in by each Dog, not long before his Death; that ſome of this Matter was ſeen in the *Primæ Viæ* of every one of them when dead (an Argument it was not all diſtributed.) That there is no Way certainly known, by which Liquors are diſcharged the *Primæ Viæ*, in this Species of Animals, beſides Vomiting, Siege, and by the *Lacteals*; and that, ſeeing neither of the two former took Place, it may not be unreaſonable to ſuppoſe, that Part of this Matter was, at each Diſſection, in its Way through the *Lacteals* to the Blood, all the Operations being at ſuch Diſtances from the Time of the Matter's being taken in, at which moſt liquid Aliments are obſerved to ſwell up the *Lacteals.*

If therefore the Liquor, ſeen in the *pellucid Lacteals* of the two laſt Kinds of Experiments, did in a great Meaſure (for I by no Means exclude the *Liquor Refluus)* conſiſt of the Matter lately taken in before the Dogs were opened, we may with good Reaſon imagine, that Water drank on an empty *Stomach* (as it was in the 2d Caſe) by ſeveral other Quadrupeds, and Men as well as Dogs, will paſs the *Lacteals*, not under a *white* Colour, but rather *pellucid*; and theſe Caſes are not uncommon amongſt us; particularly this ſeems to hold true in thoſe who drink great Quantities of diuretick Mineral Waters, in the Morning faſting; of which ſuppoſe any Perſon takes and evacuates 3 Quarts by Urine in the Forenoon, and with his Dinner, and in the Afternoon drinks 3 Pints of Beer, or the like (allowing that all the *Chyle* produced from what he takes in at Dinner, and in the Afternoon, amounts to 2 Quarts, and that theſe 2 Quarts of *Chyle* are perfectly *white*, which in all Probability is not true,) yet, I ſay, according to this favourable Account, 3 Pints of *pellucid*, for 2 of *white Chyle* will paſs the *Lacteals* in this Perſon in 24 Hours. And what is here ſaid of Water, is not unlikely to be true (*mutatis mutandis*) of ſeveral other Liquors, as Wine, Beer, *&c.* at leaſt ſo far as that they may not paſs *white* through the *Lacteals*, which is ſufficient for my Purpoſe. Again, If this Principle be true, the 3 Kinds of theſe Experiments will go yet farther, and argue, That the whole Quantity of *Chyle*, ariſing from ſome Sorts of Meat and Drink, taken either at, or near the ſame Time; or from ſome Sort of Meats taken alone, is not always *white*; for the *Lacteals* which appeared perfectly *white* in the ſeveral Inſtances of the 3d Kind, were far inferior in Number to thoſe that were *pellucid* in the ſame Diſſections.

From theſe Premiſſes there appears ſome Reaſon to think, that the *Lacteals* frequently convey Liquors which are not *white*; and that *Chyle* may (not improperly) be divided into 3 ſorts at leaſt, *viz. white*, *pellucid*, and *intermediate* to theſe; contrary to the Opinion of thoſe *Anatomiſts* who thought it to be always *white*, as that Word is contradiſtinguiſhed to *pellucid*; although by *Chyle* they underſtood (as I likewiſe do) the Effects of Drink, as well as Meat, concocted.

The Diſtribution of the Chyle; *by Dr.* Liſter. *n.*149. *p.* 242.

XXIV. It ſeems probable, 1. That in the *Digeſtion* of Meat in the *Stomach*, there is made a Separation or Solution of *urinous Salts*, no otherwiſe than in the Rotting of Plants or Animals. 2. That the *Chyle* is highly impregnated with this *urinous Salt*. 3. That the *Whiteneſs* of the *Chyle* is from the *Fermentation* it has from its Mixture with *urinous Salts*, and that if diluted with fair Water, it is wholly deprived of that Colour, the *Fermentation* ceaſing. 4. That the ſalt *Chyle* is conveyed into the venal Blood, and with it enters the *Heart*; and it is thence thrown out again *Chyle*, as it comes in, by a continual Pulſation, into the Arteries. 5. That as oft as it enters the *emulgent* Arteries, it there leaves behind it part of its ſalinous Liquor or Urine, and conſequently abates of its Colour. 6. That when ſufficiently freed of its *urinous Salt*, it becomes a *Lympha*; which we think nothing elſe but the Reſidue of the *Chyle*, not yet made into the Nature of Blood, as not ſufficiently depurated of its ſaline Particles. 7. That probably it circulates long under the Nature of a *Lympha*, often viſiting all the Parts of the Body by the Arteries, and returning again to the *Heart*, partly by its own Veſſels, and partly by the Veins. 8. That in Defect of *Chyle* (for we cannot conſtantly feed) Nature continually ſupplies the Maſs of Blood with the *Lympha* or old *Chyle*. 9. That upon every Supply of freſh *Chyle*, much of the old Stock or *Lympha* is (according to the Neceſſity of Parts) converted into this or that Uſe, and not till then. 10. That there is ever more *Lympha* in the Maſs of Blood, than there is need for the Diluting of it. The arterial Blood (be the Animal never ſo much exhauſted by Hunger) always parting with ſome, upon Extravaſation and Coagulation. 11. In the Coagulation of extravaſated Blood, there is no Precipitation of Parts, as in curdled Milk, *&c.* for if the *Chyle* be freſhly diſtributed into the Maſs of Blood, it will again ſeparate itſelf as Oil will from Water; and in like Manner it is with the *Lympha* or old *Chyle*, neither of them being as yet any eſſential Part of the Blood. 12. The venal and arterial Blood have probably both a like Quantity of *Lympha* to dilute them; but the arterial in coagulating involves within its *Craſſamentum* more than the venal: The Reaſon may be, for that the arterial is fuller of Air, which rarifies and renders the arterial *Craſſamentum* more porous and capacious of lodging the *Lympha*; which yet as it ſubſides by long ſtanding, parts with more and more *Lympha* daily. 13. The great Inſtrument of the Circulation of the Blood, is the *Syſtole* or Vibration of the Heart, which yet would not be ſufficient for hindring the Coagulation of the Blood, without a continual Supply of the *Lympha* to dilute it.

Chylification; *by Mr.* William Cowper. *n.* 220. *p.* 231.

XXV. In the Reception of the Aliment, whoſe Groſsneſs of Parts requires *Maſtication*, the *Dentes Inciſorii* are for the moſt Part employed to divide it from the more bulky Part. When a proportionable Piece is thus taken into the Mouth, the Lower-Jaw is variouſly moved by its proper Muſcles, and *Maſtication* is begun and carried on by the Aſſiſtance of the *Tongue*, *Cheeks* and *Lips*; the two firſt ſtill applying the leſs divided Parts of the Aliment to the *Dentes Molares*, till there is an equal Comminution of all its Parts. At the ſame Time divers of the Muſcles, employed in the Motion of the Lower-Jaw, are alſo ſerviceable, in haſtening the *Saliva* or Spittle ſeparated from the Blood by the *parotid Glands*; thoſe of the Lower-Jaw and under the Tongue into the Mouth; the *ſalival Glands* of the Cheeks and Lips alſo contributing their Juices, do altogether join with the *maſticated* Aliment,

ment, before or at the ſame Time it is made fit to be ſwallowed; which Action is called *Deglutition*, and is thus performed.

The Aliment, as well what is fluid as that *maſticated*, being lodged on the Tongue, which does ſomewhat hollow itſelf, by Means of its own proper muſcular Fibres, for the more commodious entertaining the larger Quantity, its Tip and Sides are applied to the Inſides of all the Teeth of the Upper-Jaw (and *Gingivæ* or Gums of thoſe who want Teeth) the Tongue is ſuddenly drawn up by the *Muſculi Styloglоſſi* and *Mylogloſſus*, together with thoſe Muſcles which pull the *Os Hyoides* upwards; at the ſame Time the *Fauces* are alſo drawn up, and their Cavity enlarged by the *Muſculi Stylopharingei*; and about two thirds of the Tongue's ſuperior Surface is adequately applied to the Roof the Mouth; the *Epiglottis*, from its Poſition being conſequently depreſſed, does thereby cover the *Glottis* or *Rimula* of the *Larynx*, and prevents any Part of the Aliment from deſcending into the Wind-pipe. In this Part of the Action of *Deglutition*; the *Glands* under the Tongue, and the *excretory Ducts* of thoſe of the Lower-Jaw, are compreſſed, and their ſeparated Liquors or Spittle voided by their *Papillæ*, ſituated at the lower Part of the *Frænum* or Ligament of the Tongue; and
Myot. Ref. *p.* 76. this is done by the *Muſculus Mylo-hyoideus*. When the Aliment is thus forced into the *Fauces* or upper Part of the *Gula*; at the ſame Time the *Gargareon*, together with the *Uvula*, are drawn upwards and backwards by the *Muſculi Sphænoſtaphyli*; by which Means any Part of the Aliment is hindred from aſcending into the *Foramina Narium*; and the *Fauces* by the
Myot. Ref. *p.* 88. *Muſculus Pterygopharyngeus* and *Oeſophageus*, are contracted; whereby the Aliment is not only compreſſed into the *Gula*; but the Matter ſeparated from the Blood by the *Glands* of the *Fauces*, eſpecially of thoſe large ones called *Tonſillæ*, is forced out of their Cells or *excretory Ducts* to join with it in its Deſcent to the Stomach by the *Gula*, through which latter it paſſes, by the Action of its *muſcular Fibres*.

The Aliment thus impregnated with *Saliva* in *Maſtication* and *Deglutition*, being received into the *Stomach*, there, meets with a Juice ſeparated from the Blood by the *Glands* of that Part, whoſe *excretory Ducts* open into the Cavity of the *Stomach*. By the Commixture of theſe Liquors, whether of *Saliva* or Juice of the *Stomach*, a proper *Menſtruum* is compoſed, by which the Parts of the Aliment are ſtill more and more divided by its inſinuating into their Pores, by which the Air before impriſoned in their leſs divided Parts, is not only ſet more at Liberty, but by the natural Heat it muſt neceſſarily ſuffer ſuch a Rarefaction, as that thereby the whole *Stomach* becomes ſtill more and more diſtended: Hence it is that we have leſs Appetite ſome time after eating (when this Intumeſcency is made) than we had immediately after: Hence alſo ariſe thoſe frequent Eructations from divers Aliments, as old Peaſe, Cabbage, and divers other Vegetables we frequently eat; all which become very much diſturbing in depraved Appetites and weak Stomachs. At the ſame Time when this Intumeſcence and Agitation of the Matter is made in the *Stomach*, the Contents of the neighbouring *excretory Ductus's*, namely the *Bile* in the *Gall-Bladder*, and *Liver Ducts*, and *pancreatick Juice* in the *Ductus Pancreaticus* are compreſſed into the *Inteſtinum Duodenum*, through the Extenſion of the *Stomach* itſelf; the refluent Blood of the *Stomach*, at that Inſtant, being, in ſome Meaſure, retarded, whereby the *Muſcular Fibres* are more liable to be contracted. Nor can we conceive how the Liquor of the *Stomach*, after having joined with the *Saliva* and Aliment, ſhould be ſtill ſo plentifully excreted from the *Glands* of that Part, as to irritate its internal Membrane, and excite its *muſcular Fibres* to contract, ſince the Muſcles of the *Abdomen* would, in like Manner as in *Vomiting*, be drawn into a Conſent of co-operating, and the Aliment would be forcibly rejected by the Mouth: Beſides, ſhould the Liquor of the *Stomach* be ſo diſturbing in *Chylification*, what would it be, ſo ſoon as all its Contents were diſcharged? The Irritation the *Stomach* undergoes in Hunger, we are firmly perſwaded does not ariſe but through an Accumulation of the *Saliva* in the *Stomach*, in Conjunction with the Liquor of the *Glands* of that Part: Hence it is we rather diſcharge the *Spittle* at that Time by the Mouth, than to ſuffer any more of it to deſcend into the *Ventricle*. Hence proceeds what we call the *Watering of the Mouth*: Hence alſo, when the *Saliva* is vitiated, the Appetite is depraved. The *Stomach*, by Means of its *muſcular Fibres* contracting itſelf, does gradually diſcharge its Contents by the *Pylorus* into the *Duodenum*, in which *Gut*, after a ſmall ſemicircular Deſcent, it meets with the *pancreatick Juice* and *Bile*; both which joining with it, renders ſome Parts of the Aliment more fluid, by ſtill diſuniting the groſſer Parts from the more pure; and here *Chylification* is made perfect.

Myot. Ref. Introd. p. 12.

The *Bile*, which abounds with *lixivial Salts*, and is apt to intangle with the groſſer Parts of the concocted Aliment, ſtimulates the *Guts*, and deterges or cleanſes their Cavities of the mucous Matter, ſeparated from the Blood by the *Glands* of the *Guts*, and lodged in their Cavities; which not only moiſtens the Inſides of the *Guts*, but defends the Mouths of the *lacteal Veſſels* from being injured by alien Bodies which often paſs that Way. The Contents of the *Inteſtines* moving ſtill on by Means of the *periſtaltick* or Worm-like Motion of the Guts, whilſt thoſe thinner Parts fitted for the Pores of the *lacteal Veſſels*, called *Chyle*, is abſorbed by them; the thicker move ſtill more ſlowly on, and by the many Stops they continually meet with, by the *connivent Valves*, all the *Chyle* or thinner Parts are at length entirely abſorbed, the Remains being meerly *excrementitious*, are only fit to be excluded by Stool.

The analogous *white* Appearance of the *Chyle*, whether in the *Stomach*, or *Inteſtines*, and always in the *Venæ Lacteæ* and *Thoracick Duct*, may be ſeen in the Commixtures of divers Liquids, which ſeparated exhibit no ſuch Appearance: Nor is this *Phænomenon* any otherwiſe than a Tranſpoſition of Particles, whether by a *Menſtruum's* inſinuating into them, dividing them into groſs Globules, as an *Acid* into a *Sulphur*, or Vinegar into Oil, *&c.* or elſe by *Precipitation*, as when a gummous or reſinous Body is diſſolved in a ſpirituous *Menſtruum*, and mixed with a *Phlegm*; ſo Tincture of *Myrrh* and *Benjamin*, &c. make a Milky Appearance in common Water.

The *longitudinal* and *tranſverſe* Orders of Fibres of the *Guts*, are the Inſtruments by which the *periſtaltick* Motion of them is performed, which Motion is not only neceſſary for puſhing their Concerns forwards; but by the reciprocal Contraction of thoſe Muſcular Fibres of the *Guts*, and Appoſition of their *connivent Valves*, the Mouths of the *Lacteals* are diſpoſed to receive what is fitted for them: Hence it is we can by no means make any Fluid whatever paſs from the Cavity of the *Guts*, in thoſe *lacteal Veſſels*, in a dead Animal. A farther Uſe of this Contraction of the Muſcular Fibres of the *Inteſtines*, is to accelerate the *Chyle* in its Progreſs in the *Lacteals*, till the *Lympha* derived from the Extremities of the Arteries of the *Guts* joins with it, which Conjunction is made in the *Lacteals*, before they leave the external Surface of the *Inteſtines*. By this Means, the Progreſſion of the *Chyle* is made towards the *Meſenterick Glands*, into whoſe Cells it is received, where it again mixes with a Juice brought in by the Arteries of each *Gland*; which Juice, or *lymphatick Liquor*, not only farther dilutes the *Chyle*, like that from the Arteries of the *Inteſtines*, but adds a freſh *Impetus*; by which its Motion is farther carried on through the *Vaſa Lactea ſecundi generis* (ariſing out of each *meſenterick Gland*, and diſcharging their Contents into the *Receptaculum Chyli.*) Here the *Chyle* meets and joins with the *Lympha* ſent through the *Lymphæ-Ducts* from the inferior Limbs and neighbouring Parts, whereby the *Chyle* is not only farther prepared, but its Aſcenſion is promoted in the *Thoracick Ducts*, whoſe ſeveral Diviſions and *Inoſculations* (like the Veins of the *Teſticles*) with its many Valves looking from below upwards, and advantagious Situation between the great Artery and *Vertebræ* of the Back, together with the *Lymphæ-Ducts*, diſcharging their *Lympha* derived from the Lungs and neighbouring Parts of the *Thoarx*, does demonſtrate the utmoſt Art ſtill uſed, in order to its Aſcenſion towards the Left *ſubclavian Vein*. Before the *Thoracick-Duct*, thus charged with the *Chyle* and *Lympha*, empties itſelf into the *ſubclavian Vein*, it receives the *Lympha* brought from the ſuperior Parts; all which joining, are ſoon diſcharged into the Left *Subclavian Vein*, where meeting with the refluent Blood of the ſuperior Parts, paſſes with it through the deſcending Trunk of the *Vena Cava*, and joins with the refluent Blood of the inferior Parts, in the Right *Auricle* of the *Heart*, whence it is expelled by its Contraction into the Right *Ventricle*, when the *Heart* is in *Diaſtole*; but by the *Syſtole*, or Contraction of the *Heart*, it is again driven out thence into the *Arteria Pulmonalis*, through whoſe Extremities, in Conjunction with thoſe of the *Vena Pulmonalis*, it paſſes to the Left *Auricle* and *Ventricle* of the *Heart*, from whence it is again expelled in the *Syſtole* (as above) in the *Aorta* or *Arteria Magna*, by whoſe Branches it is conveyed through the whole Field of the Body: The three *tricuſpid Valves* in the Right, and two *Mitral Valves* in the Left *Ventricle* of the *Heart* oppoſing its Return into the Veins, and the *ſemilunary Valves* of *Arteria Pulmonalis* and *Aorta* preventing its Ingreſs into the *Ventricles*, are ſufficient (when rightly conſidered) to demonſtrate the Neceſſity of a Circulation of this Grand Fluid, called *Blood*.

An ill Digeſtion *by too much Study; by M.* Chr. Kirby. *n.* 96. *p.* 6093.

XXVI. A Miniſter near *Dantzick*, about 50 Years old, being much indiſpoſed, and often relapſing into a Diſtemper accompanied with Vomiting and Purging, his Phyſician told me, he was perſuaded, that his Cure was obſtructed by the Patient's being obliged to ſtudy; for when by the Help of the Medicines preſcribed to, and uſed by him, he was brought to a conſiderable Degree of Recovery, his Studying and Preaching made him conſtantly relapſe. And to confirm this Conjecture concerning the Spirits being drawn away from the Stomach, and leaving the digeſtive Power languid, he added, That the Preacher one Day falling into a Relapſe, after a Sermon preached by him, and Vomits coming ſtrongly upon him, he caſt out, amongſt other Matter, ſeveral Pieces, ſome as large as the End of a Man's Finger, ſome leſs, of a Subſtance, to the Touch and Eye perfectly reſembling Tallow; 4 Pieces whereof weighed Half an Ounce.

Four Men living on Water without Food 24 Days; by —— *n.* 158. *p.* 577.

XXVII. Some Colliers working in a Coal-Pit at *Horſtol*, about Half a League from *Leige*, one of them in *Feb.* 168$\frac{3}{4}$, pierced a Vein of Water, which guſhing in violently, drowned one: Thoſe that were near the Mouth of the Pit were drawn out; but 4 of them being further within, ſaved themſelves upon a little Aſcent within the Mine. 24 Days were ſpent in drawing off the Water, and the 25th they were drawn out: I ſaw and examined them myſelf. They had not a Morſel of Bread with them, but lived on the Water of a little Fountain which broke out by them; 2 Bottles of which I cauſed to be evaporated, but found nothing but a ſcarce perceptible Calx remaining.

A ruminating *Man; by Dr.* Fred. Slare. *n.* 193. *p.* 525.

XXVIII. Having heard of a Perſon at *Briſtol* that eat his Meat twice, I procured the following Account of him from Mr. *Day*, at that Time Mayor of *Briſtol*, in Anſwer to a Set of Queſtions I ſent thither.

He begins to chew his Meat over again within a Quarter of an Hour after his Meals, if he drink with it; if not, ſome Time longer. This chewing, after a full Meal, laſts about an Hour and an Half. If he go to Bed preſently after Meals, he cannot ſleep till the uſual Time of chewing be over. The Victuals, upon the Return, taſte ſomewhat more pleaſant than at firſt. Bread and Meat, and Cheeſe and Drink, does ſeem to me to return much of ſuch Colours as they would be of, if they were mixed together in a Mortar. Liquids, as Broth or Spoon-meat, return to his Mouth all one as dry and ſolid Food. The Victuals lie heavy in the lower Part of his Throat, as it ſeems to him, until it has paſſed the ſecond Chewing; afterwards it paſſes clean away. This he always obſerves, that if he eats of Variety of Things, that which paſſes down firſt, comes up firſt again to be chewed. If this Faculty leave him, it ſignifies Sickneſs, and he is never well till it return. He is about 20 Years of Age, and was always thus ſince he can remember. His Father does ſo ſometimes, and in ſmall Quantities, but nothing like to this. He was formerly bred up in the Mines, but now he is a Day-Labourer, and of tolerable Senſe and Reaſon.

I have known ſeveral in *London* that do not fail to throw up an ill-taſted and bitter Maſs, Half an Hour, or an Hour after feeding, and that to their great Diſguſt; but in true *Rumination* it returns pleaſant, and they chew it the ſecond Time with Delight.

A Bulimia; *by Dr.* James Burrough. *n.* 264. *p.* 598.

XXIX. In *May* or *June* 1700, a Labouring-Man, of middle Age, at *Stanton* (7 Miles from *Bury*) had for many Days together ſo inordinate an Appetite, that I had it atteſted to me from an Eye-witneſs, that he eat up an ordinary Leg of Veal roaſted at a Meal. He would eat Sow-Thiſtles, and divers other Herbs as greedily, during the Time his βουλιμία laſted, as the Beaſts that are wont to uſe ſuch Food; and all he could get was little enough to ſatisfy his Hunger. I am told he voided divers Worms, as long and as big about as an ordinary Tobacco-Pipe. After which his Appetite declined by Degrees, till it came to be of a common Rate with that of others. He cannot do ſo good a Day's Work now as he was wont, but has almoſt recovered his wonted Strength again.

The Order of all the Bowels inverted; by Dr. Henry Sampſon. *n.* 107. *p.* 146.

XXX. A Miniſter in *Yorkſhire* was troubled with a Cough, and other Miſchiefs; for Relief againſt which he took a Journey to *London*, and that, for the moſt Part, on Foot. He lived not above a Fortnight after he came up. In his Sickneſs he was much addicted to drink Brandy, which haſtened his Death. We obſerved his Limbs to be much macerated, his Belly was ſwelled with ſome Inequality, eſpecially in the Tract of the Right Muſcles: A conſiderable Quantity of Water was taken out of it; his Guts inflamed, and extended with Wind; his Gall very viſcid; his Lungs inflamed, and beſet with divers *Glandules*. The *Order* of his Bowels were *inverted*; his *Liver*, which was very large, lay in the Left *Hypochondre*, and his *Spleen* in the Right; the *Cone* of his *Heart* was on the Right Side, and accordingly the larger and thinner *Ventricle* was found on the Left; and the thick one, which in others is on the Left Side, was in him on the Right. The *great Artery* deſcended on the Right Side, and the *Vena Cava* aſcended by his *Liver* on the Left. The *Oeſophagus* deſcended to the firſt Orifice of the *Stomach* on the Right Side, which made the *Pylorus* and Entrance of the *Pancreas* be on the Left, and the firſt Flexure of the *ſmall Guts* to be towards the Right: So that the Beginning of the *Colon*, with its *Appendicula*, lay at the Left *Os Ilion*, and the *Flexura Sigmoidæa*, towards the Right. This inverted Situation of his Bowels had not any evident Influence upon his Diſeaſes and Death. He was about 30 Years of Age, a married Man, had ſeveral Children, was of a Middle Stature, healthful till toward the latter End of his Time: He had no Prominency on the Left Side, more than the other; was not Left-Handed, nor had any Weakneſs on his Left Side.

The Cæcum *of a Bitch cut out; by Dr.* Will. Muſgrave. *n.* 151. *p.* 324.

XXXI. In *Eaſter-Week*, 1683, I cut out the *Cæcum* of a Dog; but 2 Days after the Operation the Dog died. But in *April* 1683, I took a Bitch, of about a Year old, and opened the *Abdomen*, on the Right Side, in the *Regio Iliaca*, paſſing my Knife through the *Muſculus oblique aſcendens*,

dens, and by the Side of the *Muſculus Rectus*: Having found the *Cæcum*, I immediately put up the other Guts again into the *Abdomen*; after which I ſeparated the *Cæcum* from the *Ilium*, cutting the Membrane which binds Part of the former to the latter; then, having made a Ligature on the *Artery* which comes to the *Cæcum*, I made 3 or 4 Prick-ſeams through the Sides of the *Cæcum*, at the farther End of it, where it is continued to the *Rectum*; and by thus ſewing the Sides together, ſtopped the Paſſage of the *Fæces* that Way: After this, I cut off the *Cæcum* about ¼ of an Inch from the Stitches, and ſewed together the new made Lips. The Wounds being ſewed up, and the Bitch tied away, ſhe lapped a ſmall Quantity of Milk the next Morning, and by Degrees recovered: So that in 3 Weeks ſhe ſeemed as well as ever; and in a little Time grew fat, and proud, and brought a Litter of Whelps. In *Sept.* following I cauſed her to be hanged, and when I had opened her, we found a great Part of the *Omentum* lie in a Heap on the Right Side; it had not recovered its natural Poſture ſince it was put up with the Guts, at the firſt Opening; the Edges of the Wound were well grown together, and we did not find any thing that ſeemed to intimate the leaſt Want, or ſupply the Place of the *Cæcum*.

The Cæcum *dilated with an almoſt liquid Matter*; *by M.*—Giles. *n.* 225. *p.* 402.

XXXII. *An.* 1689, a Lady about 64 Years old, had a hard round *Tumour* in the lower Region of the *Belly*. They moved this Globe in the ſame Manner as they do the *Matrix*, when it is big with a Child of 6 or 7 Months old; no Accidents like a *Fever*, Pain, Vomiting, Loſs of Blood, *Fluor Albus*, &c. accompanied this *Tumour*, but a conſtant voiding of Urine. The Phyſicians, after much Search and Conſultation, agreed that it was a *Schirrus*; but ſome placed it in the *Epiploon*, others in the *Meſentery*, and others faſtened it to the *Matrix*. In View of this, they gave her *Emeticks*, ſtrong *Purgatives*, *Diureticks*: They applied *Emollients* and *Reſolvents*; but all to no Purpoſe. But having taken the Air one Day in her Coach, at her Return ſhe had an Inclination to go to Stool, and filled a Baſon with groſs Excrements, a little black, and not very ſtinking: This ſhe did a ſecond Time, and found herſelf immediately relieved; her *Swelling* diſappeared, her Urine ſtopped, and in a few Hours ſhe was perfectly well.

A Year after that, ſhe fell into an *Apoplexy*, out of which ſhe recovered by *Emeticks* and *Purgations*. In 1691, the *Tumour* ſhewed itſelf again with the ſame Marks as before; and all poſſible Care was taken to make Nature do again what ſhe had before done with ſo good Succeſs. But though the *Purges* and *Clyſters* did very ſtrongly their Office, ſhe was nothing relieved; the *Tumour* augmented daily, and two Years after its firſt appearing, the Party died.

When I had opened the Body, the *Tumour* appeared to be nothing elſe than the *Cæcum* dilated; its Membranes were outwardly ſmooth, and of the ſame Colour with the *Inteſtines* without Alteration, and full of Veſſels of all Sorts. The *Ileon* laid along the *Tumour*, being flat againſt it, and returned to join the *Colon* as is uſual; ſo the Excrements had the Liberty to paſs from the *Ileon* to the *Colon*, without entering into it. I found in this *Tumour* about 3 *Chopins* (or *Quarts*) of greyiſh Matter, without Smell, and of a Conſiſtence rather liquid than thick. The interior Membranes were very beautiful; and all the Parts of the *Swelling*, as well as of the neighbouring Organs, appeared very ſound.

I could not diſcover any Hole or Communication this *Tumour* might have had with the *Ileon*, yet ſome there muſt have been in the Beginning by which it diſcharged its groſs Excrements; but after this Evacuation I believe that this Opening was ſtopped, and that the Sides of this great Bag, which had come cloſe together by the going out of this groſs Matter, did by Degrees ſtretch and open themſelves to receive this heterogeneous Stuff, which I found there, produced either by the *Glands* of theſe Parts, or ſome *lymphatick Veſſels* which I ſaw there, or ſome fluid Bodies expreſſed from the *Chyle*, or other Humours. The Compreſſion which the *Tumour* made on the Bladder, made the Urine run out as faſt as it came in; its *Sphincter* not being able to reſiſt the Violence of this Load.

The Cæcum *extended with Cherry-ſtones; by Mr.* Knowles. *n.* 265. *p.*617.

XXXIII. Mr. *Knowles* being called to open a Youth, who died, as was ſuppoſed, of the *Cholick* and *Convolvulus*, found the *Cæcum* vaſtly extended, and ſtuffed with abundance of Cherry-ſtones, which were the Occaſion of his Death.

The Uſe of the Inteſtinum Cæcum; *by Dr.* M. Liſter. *n.* 95. *p.*6062. *n.* 155. *p.* 455.

XXXIV. We have obſerved (among many other Particulars in the *Guts*) the Uſe of the *Inteſtinum Cæcum* to be ſubſervient to that of the *Colon* and *Rectum*, which is manifeſt in ſuch Animals, where Nature intends a certain and determinate Figure to the Excrements.

I underſtand by determinate Figure, 1. The Excrements divided into many ſmall Parts of a like Shape; ſuch as Sheep, Deer, Conies, Hares, Rats, Mice, Horſes, Caterpillars, ſome Snails, *&c.* do naturally void. 2. In a greater Latitude, I oppoſe figured Excrements to liquid, as *C. Celſus* in ſome Place doth: Thus the Dung of Pigeons, Geeſe, and Men, Cats, Dogs, *&c.* may be ſaid to be figured. Now the *Cæcum*, in my Opinion, is ſubſervient in ſome Meaſure to the Figuration of both, but moſt manifeſt in the firſt Kind. My Meaning is, that probably the Uſe of the *Cæcum* is to keep the Excrements, which ſhall paſs into its Cavity (and I believe all, or moſt Part of them, do ſo in ſound Animals) ſo long until they are ſufficiently drained, baked, hardened, or of a due Conſiſtence (as Clay is tempered for the Mold) to receive the Figure to be given it from the *Colon* and *Rectum*. This Uſe, I ſay, of the *Cæcum*, ſeems to me to be much more manifeſt in ſuch Animals as have figured Excrements of the firſt Kind. In Rats, for Example, whoſe Excrements are conſtantly alike figured, the *Cæcum* is very large, more capacious than the Stomach itſelf. But its Uſe in receiving the Excrements, or exhauſted *Chyle*, is not more apparent, from its large Capacity, than that other of farther drawing and tempering them to a Stiffneſs, for the Service of the *Colon*, from the admirable Contrivance and Structure of this latter Gut, which is a *Phænomenon* that deſerves further Conſideration: It is, I ſay, to be noted, that immediately under the Valve of that Gut, in this Animal, are certain ſpiral Fibres, which make a Kind of Screw. Now it ſeems to me, that the Excrements, after they are brought to a due Conſiſtency by the neceſſary Stay they make in the *Cæcum*, and being carried out thence into the ſpiral Foldings, or Screw of the *Colon*, cannot deſcend in a Perpendicular, as formerly through the ſmall Guts, but ſtill gently glide, and that very leiſurely by the Winding of the Screw; whence ariſes the Figure. And I am apt to believe, that if the *Cæcum* of a Rat, or any of the firſt Kind of Animals mentioned, was tied up, or otherwiſe hindered from its Receipt, the Animals would unavoidably fall into a *Diarrhæa*; there being, I ſay, no Reaſon, that I can foreſee, why the yet liquid Excrements, or exhauſted *Chyle*, ſuch as we conſtantly find it, even at the very Bottom of the *ſmall Gut*, ſhould ſtop at the Entrance of the *Colon*, and not ſpeedily glide through the Screw, in a downright Deſcent; that is, elude the Device of Nature, and make the Configuration of that ſo curiouſly contrived Part uſeleſs: We, I ſay, ſuppoſing the Experiment to have taken away the neceſſary *Diverticulum* and Repoſitory of the unprepared Excrements, in tying up the *Cæcum*.

I know not whether the Obſervation will hold good in general Terms, becauſe, I ſay, I have not yet purpoſely examined divers Animals in Nature; *viz.* That wherever there are elegantly figured Excrements of the firſt Kind, there is ever a capacious *Cæcum*; and, on the contrary, the leſs accurately figured and more liquid the Excrements of any Animals are, the leſſer the *Cæcum*, or none at all. This is certainly true, that ſome Animals which are naturally looſe, have no *Cæcum* at all, or very little, as the *Talpa*, the *Echinus Terreſtris*, the *Gulo*; and amongſt Birds the *Wood-pecker* Kind, the *Hawk* Kind, *&c.*

We forbear to offer ſome Doubts we have, concerning Nature's End in the neceſſary Figuration of the Excrements in ſome Animals; as firſt to prevent *Diarrhæa's*; Secondly, to abide Hunger the better: Thus Snails in Winter reſt with full Inteſtines. Thirdly, and chiefly to heighten the *Fermentation* and *Digeſtion* in the Stomach and ſmall Guts.

An infallible Cure of Dyſenteries; by M—— *n.* 238. *p.* 69.

XXXV. 1. The Root *Ipecacuanha* is an infallible Medicine for curing *Dyſenteries* and Looſeneſſes, how dangerous and inveterate ſoever the Diſtemper may be. But I muſt except all ſuch Patients as are diſeaſed in their *Lungs*, and *Hydropick* Perſons, whoſe Fluxes are Signs of approaching Death; and ſuch as have already *Gangrenes* in their Bowels, which they ſurely diſcover when they are diſordered in the Head, have a *Hickcough* and a Vomiting, with a Pain in the lower Belly, accompanied with Stools reſembling the Dregs of Wine, or the Waſhings of Meat, ſmelling like Carrion. As for all others ſick of a *Dyſentery*, they need but obſerve the following Rules, and they will be cured.

For 3 Days together, Morning and Evening, they muſt take one of the Papers of Powder marked with *A*, diluted with half a Glaſs of Wine and as much Water, to diſpoſe them by Degrees for Purging, and to ſweeten and correct the ſharp corroſive Humours, which are of the Nature of *Aquafortis*, and the *Spirit* of *Nitre*, and which eat away the Tunicles of the *Inteſtines*, and the Mouths of the Veſſels; from whence it comes to paſs, that from a ſingle Looſeneſs they often fall into a *Dyſentery*, becauſe thoſe depraved Humours become ſharp and corroſive, and the Malady augments every Day; ſo that to make a ſure Cure, we muſt begin by deſtroying the Sharpneſs and Malignity of thoſe Humours, which is done by this firſt Remedy:

A. ℞ *Antim. Diaph. Crabs Eyes*, of each *gr.* 10. *Croc. Martis*, *gr.* 8. *Maſt*, *gr.* 4. He muſt eat ſmall Broth 2 Hours after, or a Cruſt of Bread dipped in it, or a freſh Egg in faſhion of an Amulet, and dine lightly: If they find they have Need of Nouriſhment, after Dinner they may eat a Toaſt and Wine and Sugar, or a little Biſket ſteeped in Water or Wine. At Night they may take another Paper marked *A*, as before, and ſup lightly.

The 4th Day they muſt take the Doſe marked *B.* ℞ of good *Ipecacuanba*, well pulveriſed ʒj. with ʒvi. of *Cinnamon*, diluted in ſmall Broth, or in half a Glaſs of Wine, to clear the Stomach of a viſcid Bile, that weakens the natural Heat, and hinders the Digeſtion of the Food; ſo that the *Chyle* growing ſour, inſtead of growing bitter, does change all the Maſs of the Blood, and trouble the whole Oeconomy of the Body, which produces all the Accidents which ordinarily accompany this Diſeaſe. They ſhall take, 4 Hours after, ſome Broth, and the Remainder of the Day eat ſparingly; the Day after they ſhall take 2 Papers marked *A*, as before.

The 7th Day they ſhall take the Medicine marked *C.* ℞ good *Rheubarb*, ℈ij. *Ipecacuanba*, *gr.* xv. pulveriſe them well, and mix them in a Glaſs of *Ptiſan D*, deſcribed hereafter. This Medicine will take away Part of the Obſtructions; they ſhall take, 2 Hours after, Broth.

The 9th Day they ſhall take the Doſe marked *B* 2. ℞ good *Ipecacuanba* ℈ij. with *Cinnamon*, *gr.* vj. well pulveriſed, and mixed with Broth or Wine.

The 11th Day they muſt take a 2d Doſe marked *C*, and obſerve the ſame Regimen as at firſt.

On the 13th they muſt take the Doſe marked *B* 3. ℞ good *Ipecacuanba* ℈j. half a ʒ of *Cinnamon* with vi. *gr.* of *Nutmeg*, and obſerve the ſame Diet as on the two others.

On the 15th they ſhall take the Doſe marked *B* 4. ℞ good *Ipecacuanba* ℈j. with *Nutmeg gr.* x. well pulveriſed. They muſt keep themſelves as on the 3 former Days.

Though by this Time they find themſelves cured, yet they muſt take Care that they ſuffer not Cold in their Feet, nor elſewhere, while the Diſtemper continues; and they muſt yet obſerve as ſtrict a Diet as if they were ſick. They muſt purge once in 15 Days with the Medicine marked *C*, by which Means they will infallibly prevent a Relapſe, by freeing Nature of the Weight that oppreſſes it.

The 8, 10, 12 Days, they ſhall take in the Morning and Evening one of the Packets marked *A*, as before.

If the Sick has no Reſt in the Night-time, becauſe of great Pains, or too frequent Stools, it is convenient to take a Spoonful, or one and a half, of the *Syrup* of *Coral*, according to the Violence of the Diſtemper, mixed with a Glaſs of *Ptiſan*. This Syrup will allay the Fermentations, and the Boilings of the Humours, and procure Sleep, which repairing the Force of Nature, will give the Remedies Liberty to act more effectually. They muſt alſo take a Spoonful of that Syrup at the Evening of that Day in which they have taken the Remedy *B* or *C*.

All theſe Remedies marked before, muſt be taken in the Morning faſting, and two Hours before Supper. Thoſe who do not love to take them mixed with Liquor, may take them in a Wafer, drinking after them. If any of theſe Remedies cauſe Vomiting, as it happens ſometimes, he muſt not be diſcouraged, for he ſhall not fail to be cured notwithſtanding, becauſe theſe Remedies act briſkly on the Cauſe of the Diſtemper, only he muſt take to drink after his Vomiting, 3 or 4 Glaſſes of warm Water, that he may vomit with leſs Pain.

Children, delicate Perſons, and Women with Child, ſhall uſe it in the following Manner. For Children that are yet under 3 Years old, they muſt take but the 8th Part of the *Doſes* of the Remedies; Children from 3 Years old to 10, ſhall take a 4th Part; from 10 to 15, a third; from 15 to 20, the half. The ſame *Doſe* will ſerve for tender Perſons, and ſuch as are aged, and Women big with Child. As for robuſt Perſons, from 20 to 60, nothing ſhall be diminiſhed from the *Doſes* above marked. But all Perſons, who by reaſon of their tender Conſtitution, the Weakneſs of their Age, or big Bellies, are forbid the whole *Doſe*, ſhall uſe the Remedies a ſecond Time, in the Manner I have now preſcribed, if the firſt *Doſe* do not cure them.

In many Occaſions, when the *Dyſentery* is accompanied with a *Fever*, that the Evacuations of Blood are extraordinary, or the Pains exceſſive, the Patient may be blooded once or twice, if the Strength of the Patient allow it, to empty the Veſſels, to calm the Pain of the *Fever*, and ſtop the impetuous Motion of the Blood; after which the Remedies may be continued. In this Caſe, I would adviſe to take, before all Things, the Packet *B* 4, which before is ordered for the 15th Day; to take away that Fulneſs which is ſometimes ſo great, that there is Danger in delaying it; after which the Patient ſhall return to the *Doſe* marked for the *firſt* Day, and ſo for the reſt; on the 15th the Patient ſhall reſt.

After all theſe Remedies are uſed, the Party ſhall take, for 15 Days, a Spoonful of the *Stomachick Elixir* pure, or in 4 Spoonfuls of Water: It is made after the following Method.

Stomachick Elixir.

℞ of *Red Saunders*, of *Lignum Aloes*, each half an Ounce; *Cinnamon* 2 Ounces; of little *Cardamoms*, *Galangal*, *Cloves*, *Zedoary*, each an Ounce; of *Aniſeed*, *Fennel*, and *Kermes*, each 2 Drams; of *Liquoriſh* 2 Ounces; of *Caſhu*, of *Chryſtal Mineral*, of each one Ounce; of *Raiſins* 4 Ounces; *Dates* 10 or 12: Cut the *Dates* and the *Raiſins* into little Bits, and having beaten that which ought to be beaten, put all into a *Matras*, and pour upon them a Quart of Brandy, in which the *Chryſtal Mineral* ſhall be diſſolved: Infuſe them a whole Night, and the next Day add 2 Pounds of *Aqua Vitæ*, and let all infuſe in the Cold for 4 Days, ſhaking the Glaſs 4 or 5 Times a Day; then filter the Liquor, and diſſolve a Pound of fine Sugar in the *Elixir*, which is thus compleat.

Its

teſtine's being violently and ſurpriſingly puſhed through the Ligament D D and reſembling a Kind of *Cæcum*. G, the Extremity of the *Ilium*, where it terminates in the *Colon*. K, the *Colon* moderately contracted, and in a natural State. L, the *Inteſtinum Cæcum*.

The Fæces *diſcharged at an Ulcer in the Groin ; by Dr.* Will. Earnſhaw. *n.* 176. *p.* 1204.

XXXVII. A Woman of *Alceſter* in *Warwickſhire*, about forty Years of Age, returning home from a neighbouring Town, was ſuddenly ſeized with an exceſſive Pain, in her right *Groin*, ſucceeded with a violent *Hiccup*. In about half an Hour afterwards a Swelling appeared there of the Size of a Nutmeg, which became gradually hard, and at laſt black. She was ſo feveriſh and tormented with Pains (no Phyſician being called in to her Aſſiſtance) that ſhe was quite light-headed and knew no Body ; ſo ſhe was recommended to the Prayers of the Publick, as a Perſon certainly dying. At laſt however by the Application of ſome Kind of *Cataplaſm*, the *Ulcer* broke, and whatever ſhe eat or drank was diſcharged by it, almoſt unchanged, within a Quarter or Half an Hour after taking it ; but without the leaſt Pain either in the Ulcer or *Inteſtines*. So that one Day having eat ſome boiled Milk, firſt the Milk itſelf, and afterwards the ſame curdled, burſt out from the Ulcer with a Noiſe (as from the *Anus*) and a Kind of Froth. At laſt I was called to her, and found her hectick, emaciated, droughty ; but in the mean Time ſhe made Water, and went to Stool regularly without any Pain. The Ulcer was about three or four Inches long, one broad, not at all deep, but almoſt equal with the Skin. I ſent her a purging *Ptiſan* for four Doſes ; but the firſt Doſe flowing preſently out of the Ulcer, and ſhe having no Stool that Day, I gave her a purging Bolus, part of which ſhe voided in about Half an Hour, but ſhe had two Stools afterwards, with a much leſſer Evacuation from the Ulcer than formerly. She took the ſame Bolus the following Day, whereby ſhe had three large Stools, with a great deal of *Fæces*, and the *Ulcer* diſcharged very little through the Night. After this I adviſed her to drink two or three Pints a Day of a drying Vulnerary Drink, and to repeat the purging Bolus now and then, by the Uſe of which Medicines ſhe got well in a Fortnight, if I rightly remember.

The Lumbrici Lati *and* Cucurbitini ; *by Dr.*M. Liſter. *n.* 95. *p.* 6062.

XXXVIII. 1. We have found in the Guts of a Dog, perhaps more than 100 of the *Lumbrici Lati*, or *Tape-Worms*. The *Duodenum* was exceedingly ſtuffed out and extended with them. Which alſo well agrees with another Obſervation I made in a Mouſe, where I found the *Duodenum* to be far bigger than the Stomach itſelf, by reaſon of the great Numbers of theſe Worms, for Kind, which were contained in it. For Kind, I ſay ; for theſe *Tape-Worms* were of a quite different Shape from thoſe of the Dog, or any that I have ever yet ſeen. To proceed, we found them alſo in the Dog's *Jejunum* and *Ileon*, but not any one lower than the *Valvula Coli*, nor any higher than the *Duodenum*, or within the *Pylorus*. Below the *Duodenum* they lay at certain Diſtances one from another, though ſometimes by Pairs, or more of them twiſted together : Near them was conſtantly to be obſerved an

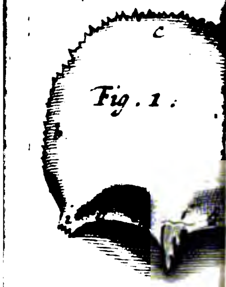


Fig. 1.

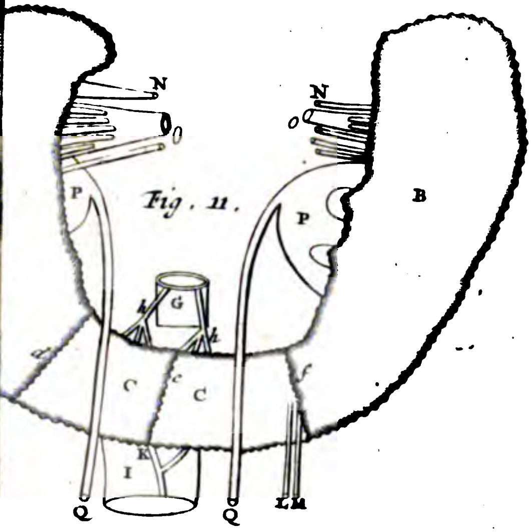
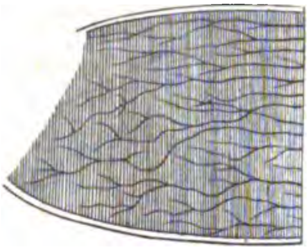


Fig. 11.

Fig. 14.



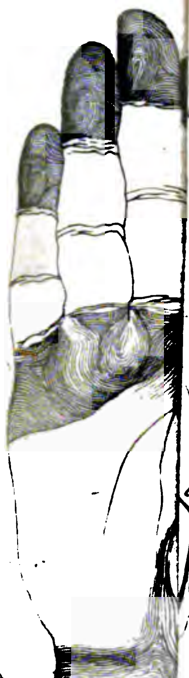
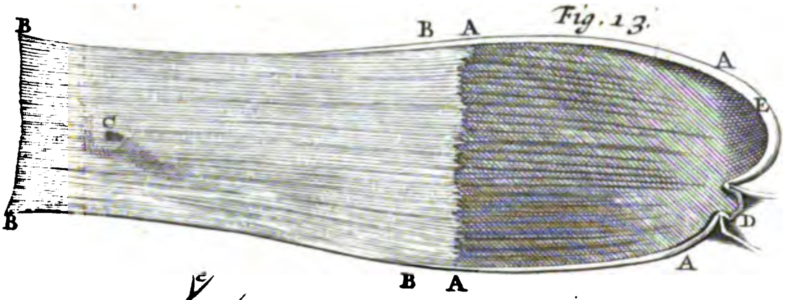
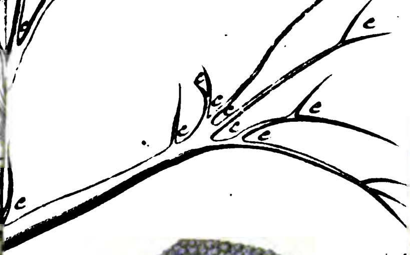


Fig. 13.





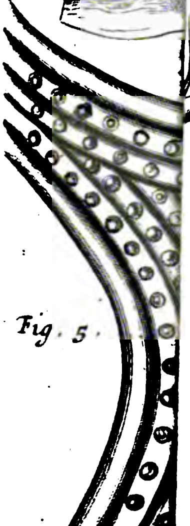


Fig. 5

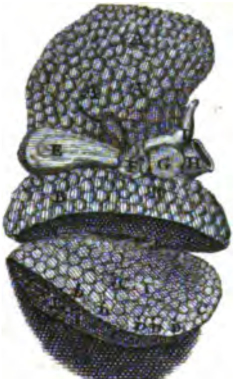
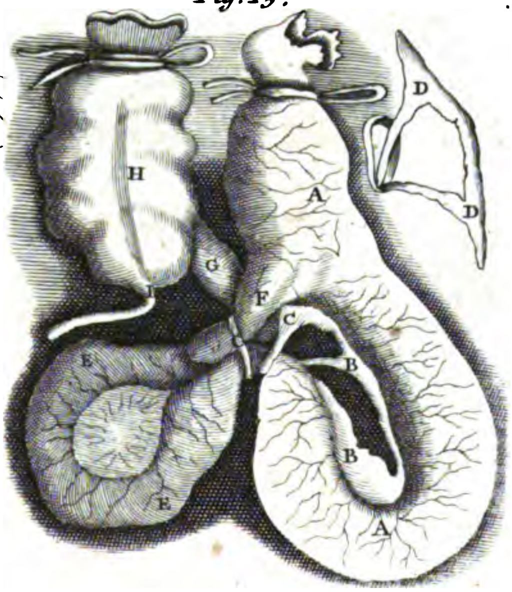


Fig. 12.

Fig. 15.



Excrement of their own, diſtinct for Colour (more grey) and Conſiſtence from the *Chyle* (the Obſervation being made in a Dog, plentifully fed for other Purpoſes) juſt as we find in Worm-eaten Tracts of Wood, where the *Coſſi* leave behind them the Wood which hath paſſed through their Bodies. Theſe *Worms* lay moſtly with the ſmall Ends upward, feeding upon, and expecting the *Chyle* in its Deſcent. Theſe *Lumbrici Lati* were none of them above one Foot long, and moſt of them of an equal Length and Bigneſs. The one End was as broad as my little Finger-Nail, and pointed like a Lancet; the other End, coming ſmall gradually for the 3d Part of the whole Length of the Animal, was knotted, or ended in a ſmall Button like a Pin-head. They were every where, and in all Parts of them alike, Milk-white; of a flat and thin Subſtance, like fine *Tape*, divided into infinite Rings and Inciſures, each Inciſure having ſharp Angles, on both Sides, looking to the broader End, ſtanding out beyond each other: From which alſo I take the ſmall End to be the Head, elſe the ſharp Corners of the *Annuli* would neceſſarily hinder the Aſcent of the Animal; whereas, if the contrary be true, they ſerve to keep it up. Each Ring hath alſo on the one Side only, and that alternately, one ſmall Protuberance, much like the middle Feet of the Body of ſome Caterpillars. Comparing our Animals with the Cut of *Tulpius*, it was not very eaſy for me to obſerve, becauſe of the great Reſemblance, the Specifick Difference of the *Lumbrici Lati* of Men, and thoſe of this Animal. I could not diſcover any Motion in any Part of them, in Water, or out of it; nor did they ſeem, if pricked, or otherwiſe hurt, much (if at all) to contract themſelves, or ſhorten the *Annuli*: So that they then appeared to me as Things without Motion or Senſe.

Med. Obſerv. l. 2. *c.* 42.

2. There is another Sort of *Lumbrici Lati* to be met with very frequently in Dogs, called *Cucurbitini*, from the Likeneſs each *Annulus* or Link hath to a Cucumber-Seed. I have found of them about Half a Foot long; but more often broken into ſhorter Pieces. The former by us deſcribed, is undoubtedly a compleat and entire Animal; but there is great Reaſon of Suſpicion, that this is a Chain of many Animals linked together. Theſe Animals, for Kind, have been obſerved to have been voided by Men, and found encloſed in a Gut or Membrane of a prodigious Length. And a Perſon of great Integrity affirmed to me, That he once aſſiſted at the Opening of a Dog, in which one of the Kidneys was obſerved to be quite waſted, and become a perfect Bladder, and in that Bladder they found ſomething like an Animal of a monſtrous Shape, which being diſſected, was nothing elſe but a Skin full of theſe *Lumbrici Cucurbitini*. Perhaps the Snakes, Lizards, Beetles, Caterpillars, Toads, and ſuch like Things as we read of in Medicinal Hiſtories to have been voided, or found in any Part of the Body, if carefully examined, were nothing elſe but the like Diſguiſes of this ſort of *Worms*, much aſſiſted by the ſurprized Fancies of the firſt Obſervers.

Ib. p. 6064.

Lumbrici Cucurbitini *found in the Kidneys of a Dog. Ib.*

The Lumbricus Latus; *by Dr.* Edward Tyſon. *n.* 146. *p.* 113.

XXXIX. The curious Reſearches of many inquiſitive Perſons after the Manner of the Generation of Inſects, and their Diſcoveries therein, have much advanced the Doctrine of *univocal Generation.* Yet one great Difficulty remains with me, how to account for ſeveral of thoſe that are bred in animal Bodies; not ſuch as we may ſuppoſe to be hatched from the Eggs of the like Kind, that are received with the Food or otherways, but of which we cannot meet with a Parallel, or of the ſame Species, out of the Body, in the whole World as is known beſides. I ſhall inſtance only in two, the *Lumbricus Latus,* and *Teres,* which remarkably differ from any others out of the Body, from whence, or from the Seed of the ſame, it may be any ways thought they may be propagated in it. But though we are gravelled in aſſigning how firſt theſe Sorts of *Worms* ſhould come into the Body; yet being once there, there is nothing more plain, than that the *Lumbricus Teres* is propagated by an *univocal Generation*; there being in this Sort ſo perfect a Diſtinction of Sexes, Male and Female; and the Organs belonging to each ſo curiouſly contrived, ſo conſpicuous and plain, that they may further illuſtrate the late Inventions of ſome, and do ſeem to ſhew, how ſollicitous Nature is in preſerving and propagating the meaneſt Species.

I have made Obſervations upon both Sorts of theſe *Worms*; thoſe on the *jointed Worm* I ſhall here give you.

1. This *Worm* is *flat*; and hence it is called *Lumbricus Latus*; and by *Hippocrates*, Ταινία, *i. e. Faſcia*; and by ſome in *Engliſh*, the *Tape Worm.* This *Flatneſs* of the Body, ſufficiently diſtinguiſhes it from the others which are uſually bred in the Body; and are either ſhort or ſmall, and then called *Aſcarides*; or longer, as the *Teretes*: Nor is there any out of the Body, that I know of, that are thus *flat.* The Breadth of this *Worm* is various, both in the ſeveral Parts of the Body of the ſame *Worm*; as alſo in one *Worm* compared with any other. The longer the *Worm* is, the broader uſually are the latter *Joints.*

2. The *Joints* of this *Worm* are ſo ſet on, that the Lines or extream Edges of the former, come over the latter; which is to be well obſerved, and may direct us to that Part or Extream, where we may ſuppoſe the *Head* to be placed. Theſe Edges of the former *Joint*, which ſhoot over the latter, in ſome I have obſerved to be plain and ſmooth, in others crenated, and indented in all. By drawing it through one's Fingers from the Tail to the Head, you will find a great Roughneſs; but if the other Way, from the Head to the Tail, it ſeems Smooth.

3. Many, who have obſerved this *Worm*, do take Notice of the Difference of its *Extreams*, how much larger one is than the other; but not well conſidering the Setting on of the *Joints*, abundance have been miſled into an Error, by taking the *Head* for the *Tail.* Thus *Spigelius* and *Amatus Luſitanus* make the ſlender Part of the Body to be the *Tail.* But in all I have hitherto obſerved, I conſtantly found that *Extream* where the *Head* is ſet on (if we may allow it to have any) much ſmaller than the other, ſometimes not half a quarter ſo broad; in others leſſer or greater, often according to the Length of the *Worm*; but in all I take Notice, if they are of

any conſiderable Length, that the *Joints* towards the *Head* are vaſtly ſhorter than towards the *Tail:* For in one I have by me 24 Foot long, there about 5 *Joints* make an Inch; whereas the latter *Joints* here are above an Inch long: But in ſome I have taken out of Dogs, there were 30 or 40, ſometimes above 60 *Annuli*, which towards the *Head* did make up but the Length of an Inch; whereas towards the *Tail*, 6 or 7 *Joints* did equal that Meaſure, and ſometimes 3; ſo that gradually the *Joints* ſeem to increaſe, both in Length and Wideneſs, as they approach the *Tail*. But withal it muſt be obſerved, that according to the Corrugation or Extenſion of theſe *Joints*, their Dimenſions will be altered, which is moſt apparent in them when alive; that likewiſe there is a great Difference of theſe *Joints* in the various Species of this *Worm* (for I think there are more Sorts than one.) And as to the *Differences* of them, there are theſe I have taken Notice of, 1. That in moſt, the *Joints* gradually, and very ſenſibly, increaſe in Length; but in a vaſt Quantity of this *Worm*, voided by a Perſon here in Town, but in ſeveral Pieces, 2, 3, 4, or more or fewer Yards long, I obſerved for a greater Length the *Joints* much the ſame; but I ſuppoſe I ſaw here neither the *Head* nor *Tail*. 2. In ſome, thoſe *Orifices* which I take for *Mouths* were placed about the Middle of the *Joints*, on the Edges; in others, about the Middle of the *Flat* of the *Worm* near the *Jointings*. 3. Theſe *Juttings*, or Lips of the upper *Joints* over the lower, in ſome were plain, in others crenated, in others the great Protuberatings at the Side rendered the whole *Worm* ſerrated. 4. Uſually the ſame *Joint* is much of a Bigneſs throughout; but the upper Extream ſomething leſſer than the lower. But in one I took out of a Dog, I obſerved that in ſome of the laſt *Joints* towards the *Tail*, the upper Part of the *Joint*, by which it was faſtened to the foregoing *Joint*, was very ſlender, in the Middle broad, and towards the other *Extream* grew taper again: But in another I took out of the ſame Dog, I could not obſerve the ſame Thing; as neither did I in a 3d I took out of another Dog, which was about 2 Yards long, whereas theſe were each 1 Foot, or 1 ½ Foot long. 5. This *Worm* lies convoluted in ſeveral Places; and it is ſometimes as long as all the Guts, and ſometimes vaſtly exceeds that Length. *Olaus Borrichius* tells us, that a Patient of his, in a Year's time, has voided 800 Foot of this Sort of *Worm*, but in ſeveral Pieces, and that hitherto he has not met with the *Head:* For the Patient obſerved, that always in the Voiding it, he perceived it break off. I can parallel this with an Inſtance of a Perſon here in Town, once my Patient, who has voided vaſt Quantities of this *Worm* for ſeveral Years together, but in ſeveral Pieces, 2, 3, 4, 6, or more Yards long; but all put together, would much exceed the Length of that of *Borrichius*. But to be at any Certainty in this Particular, I think is very difficult: For when it comes to any conſiderable Length, by lying in ſeveral Cluſters, or Convolutions, in the *Inteſtines*, the Deſcent of the *Fæces*, eſpecially being quickened by a Purge, will be apt to break Part off; which yet ſtill will live and grow till quite carried out of the Body. Beſides, I queſtion, whether all thoſe Pieces which are voided by the ſame Perſon, may be always reputed Parts of the ſame *Worm*, or of different.

Act. Med. Barthol. *Vol.* II. *Obſ.* 47.

But this is undeniable, that this *Worm* is vaſtly long, which plainly appears, even by thoſe Pieces we ſee of them; for beſides the Inſtances mentioned by ſeveral Authors, I have a Piece of one by me of a great Length, voided by a young Man about 20 Years of Age, upon the Uſe of an Emulſion of the cold Seeds. He dragged it from himſelf, not without ſome frightful Apprehenſions that Guts and all were coming out; he plainly perceived it alive, and to move; and having put it in a wide-mouthed Glaſs, it often endeavoured, by raiſing its Body, to get out; but the cold Water, into which it was put afterwards, ſoon killed it. I meaſured it, and found it 24 Foot long. In it I numbered 507 *Joints*. Its Colour was extream *white*, being turgid with Chyle; its Body *flat*, about the Thickneſs of Half a Crown where thickeſt; and the *Joints* towards the *Tail*, about ¼ of an Inch broad, thoſe towards the *Head* about ¼ as broad as thoſe towards the *Tail*; and here the *Joints* were not ¼ of an Inch long, whereas thoſe at the *Tail* were of a full Inch long and ſomething more, and from the *Head* they ſeemed gradually to increaſe in length. The *Joints* much of a Wideneſs throughout; and the jutting Edges of the former over the latter uſually plain and even, unleſs where the Contraction of the Body had rendered them a little crimpled. The *Flats* of both Sides, juſt alike, and without any Spots, Protuberances or any thing remarkable, which might diſtinguiſh them, or be obſerved, only a ſmooth Superfice; but about the Middle of the Edges of each *Joint* I obſerved a protuberating *Orifice*, which would eaſily enough admit of a Hog's Briſtle, and was open and apparent to the naked Eye. Theſe *Orifices* were placed for the moſt part alternately, in one *Joint* on the Right Side, in the following on the Left: But ſometimes I have obſerved them in two, more ſeldom in three ſucceeding *Joints* of the ſame Side; but never in one *Joint* more than once. Theſe *Orifices* I take at preſent for ſo many *Mouths*.

4. But ſince I have here mentioned of what *Length* they have been obſerved in Man, I ſhall alſo add how *long* thoſe were I have ſeen in *Dogs*. For though they are to be met with only in the animal Kingdom, yet in abundance of the Subjects of this, and thoſe too of different Species; they are very frequent in *Fiſhes*, as in Pikes, Whitings, Bleaks, Crabs, Herrings, *&c.* and upon this Score ſometimes they prove a great Damage to the Merchants,
Obſ. l. 3. as *Platerus* obſerves, they being forced to fling them away. In *Bleaks*, in the Summer-time, if you open thoſe that leap and tumble in the Water, from the Torment they feel within, you ſhall almoſt conſtantly meet with this *Worm*. In *Oxen* often they are obſerved likewiſe; not ſo much in *Calves*; in *Dogs* very frequently. I have oftentimes found them here myſelf in Diſſection. I met the firſt Time with two; there was indeed another Piece, which I take only as broken off from one of the former, becauſe here both *Extreams* were pretty large, and the *Joints* throughout proportionably long: But in the two others, the Diſproportion was very remarkable; for beſides obſerving here their *Heads* hiſpid, or thick beſet with Hairs or ſmall Spikes (which I ſhall afterwards deſcribe) I took notice that this *Extream*, if extended, was very ſlender, and when a little contracted,

the *Joints* ſo very ſmall, that they were ſcarce diſcernable by the naked Eye; but where I could better diſtinguiſh them, between 30 or 40 made the Length of an Inch: But towards the other *Extream*, or *Tail*, in one 4, in the other 6 or 7 *Joints* made that Length. One of theſe *Worms* was ſcarce a Foot long, the other not a Foot and half. In another Dog, I afterwards diſſected, I found another *Worm* with juſt the ſame *Head*, but about 5 Foot long: Towards the *Head* in this, 60 *Joints* ſcarce made an Inch; but at the *Tail*, about 3 did equal that Space; and the *Joints* here were about a quarter of an Inch broad; and in the Sides of the *Joints* in this, I plainly perceived thoſe *Orifices* I at preſent call the *Mouths*.

5. The *Head* of this *Worm* is *obſcure*, and has created many Controverſies amongſt the curious *Anatomiſts*; who yet have been forced to confeſs, after obſerving vaſt Quantities of this *Worm*, that they are ſtill at a Loſs, and know nothing certain of it. But what I have obſerved of the *Head* of this *Worm*, in 3 ſeveral ones I have taken out of the Bodies of Dogs upon Diſſection, where I know I have them whole, makes me to be ſomething more at a Certainty. I opened a Dog at the *College* of *Phyſicians*, and found a *Worm* alive in the *Ileon*, not lying ſtreight, but in many Places winding and doubling. Having taken notice how the *Joints* were, I traced it up, by carefully opening the *Inteſtine* to the ſmalleſt Extream, where I expected the *Head* to be, and which did lie towards the *Duodenum*; whereas the broader End was downward toward the *Rectum*; and this broad End was free, and did nothing adhere; whereas that ſmaller Extream did ſo firmly ſtick, and had faſtened itſelf to the inner Coat of the *Inteſtine*, that it was not without ſome Trouble, by gently raiſing it with my Nail, that I freed it from its Adheſion. Having lifted it up, I carefully viewed it; and did obſerve neither that *Biceps*, in *Tulpius*'s firſt Figure, nor the *Head* like a *Tricoccos*, as in *Mich. Febr.* but a very ſlender Body, which, being alive, it would ſometimes ſhoot out a conſiderable Length, at others, retract it in again, and ſo very much alter its Figure, by becoming broader. But whilſt I was doing this, by its wriggling its Body, it happening to fall off my Finger, it preſently took hold again, and gave me as much Trouble to free it a ſecond Time from its Adheſion as at the firſt. I put it for the preſent into Spirit of Wine, that I might more carefully view it with a *Microſcope* at Home: And in doing this, making uſe of ſome extraordinary good ones, it very plainly appeared, as is repreſented in the 20th *Figure*, *Fig.* 20. thick beſet with two Orders of Spikes, or Hooks, whereof the larger did ariſe from the Center or Middle, ſpreading themſelves over the Edges of the Circumference; the other, which were leſſer, iſſuing out about the Middle of the Center, and were ſhorter, as is ſeen in this *Figure*, and are repreſented ſideways in the 21ſt. *Fig.* 21. I could not, upon my ſtricteſt Enquiry, and with extraordinary Glaſſes too, inform myſelf of any *Orifice* here, which we may ſuppoſe to be the *Mouth*; only a little indenting there was in the Center, occaſioned by the iſſuing out of the Spikes thence. This End was not perfectly flat, but a little globous; and I could perceive by the Swelling a little below on the *Neck*, and wrinkling of the Skin, as in the *Figures*,

how it did ſhoot out, and contract its *Neck*, as I obſerved it when alive. For ſome little Space here, I could not obſerve with the Glaſſes any *Joints* at all; but after, very thick ſet, and ſmall, and gradually increaſing in Length, as they deſcended towards the *Tail*. The *Heads* of the other two *Worms* exactly appeared the ſame in the *Microſcope*, as this deſcribed; and afterwards, by carefully viewing them by my naked Eye, I could obſerve theſe *Hairs* or *Spikes*.

It was objected by ſome ingenious Perſons, whether theſe *Spikes* or *Hairs* might not be like the ſmall Feet of the *Tick*, or *Ricinus*, for its faſtening itſelf the better to help its Suction. And indeed, were it Blood it lived upon, the Caſe were plain; but ſince it is *Chyle*, what Service they could do it in this, I do not ſee; for when they faſten, the *Head* is deep immerged in the inward Coat of the *Inteſtine*, and ſo may be thought, for that Time, to get but a very inconſiderable Soop, if any; and nothing in Proportion to what is requiſite for ſo vaſt a long Body, and what it is often obſerved to be turgid with. Upon the whole, what ſeems moſt agreeable to me, and to be the true Uſe of this Part, we call the *Head*, is this; that by the Means of theſe *Hooks* and *Spikes* it might faſten itſelf, and ſo prevent its too eaſy Ejection out of the Body: For it being ſo very long, and large too, and its Body in many Places winding and convoluted, the Deſcent of the *Fæces* upon all Occaſions would be apt to carry it out with them, had it not this Hold; which is ſo faſt, that rather than looſen itſelf, Parts of the Body are ſooner broken off, which we frequently ſee in the Stool. When it penetrates the Coat of the *Inteſtine*, it contracts its *Hooks* in, and draws up its *Head* to a Point; then expands them, and takes firm Hold of the *Membrane*, by darting its ſeveral Poniards into it; which excites thoſe intolerable *Pains*, which thoſe that are troubled with them ſo much complain of, that I have known it to that Extremity that ſome have been ſcarce diſſwaded from offering Violence to themſelves, to free themſelves, as they thought, from a great Miſery: And hence it is that this *Worm* is ſo difficult a Cure, that though by Medicines and Purges, vaſt Quantities at Times may be brought away, yet ſome can hardly get a perfect Cure all their Life-time; as I know of one, who for above 20 Years has been afflicted with it, that has had the Advice of ſeveral able and eminent Phyſicians.

6. But ſince in this *Head* we find no *Mouth*, we muſt ſeek it ſomewhere elſe. I am very ſenſible with how great Difficulty my preſent Thoughts concerning this will be received, and how obvious to all it will be to raiſe Objections. But if what I here offer be true, others will find it likewiſe; if not, I ſhall not think myſelf obliged to believe it. Why at preſent I think thoſe *Orifices* in every *Joint* to be ſo many *Mouths*, I ſhall now give my Reaſons. I have already obſerved them to be of two Sorts; that in ſeveral *Worms*, both from Human Bodies, as alſo in thoſe of Brute Animals, they are placed much about the Middle of the *Joints* on the Edges; moſt frequently alternately, in one *Joint* on the Right Hand, in the other on the Left; ſometimes in two, ſeldom in more, on the ſame Side: They are protuberant, ſomething like a *Papilla*, and in the Middle a *Fig.* 19.

Foramen eaſily enough to be perceived by the naked Eye, and will readily admit a Hog's Briſtle. In the other Sort, theſe Protuberances are placed about the Middle of the Flat of the *Worm*, towards the upper Part of the *Joint*, and ſeem to be repreſented by *Spigelius*, *Sennertus*, and *Tulpius*, in their Figures of this *Worm*, though with ſome Miſtakes; and is that which Authors mean by their *Maculæ Nigricantes*, in their Deſcriptions of it.

I ſhall here chiefly inſiſt upon the former Sort, which has occurred moſt commonly to me; and a ſhort black Line here, placed tranverſe to the Body, I think was the firſt that gave me Notice of them; though ſince, in others I have not ſo conſtantly ſeen it, but only a protuberant Orifice about the Middle of the Edges of the *Joints*. That theſe are ſo many *Mouths*, I ſhall argue, *Firſt*, from the great Quantity of *Chyle* they are often turgid with. *Secondly*, from the great Appetite, but more often Thirſt, and almoſt always that Emaciation which they occaſion. *Thirdly*, that there is no other *Mouth* beſides obſerved. *Fourthly*, that no Uſes can ſo fitly be aſſigned to theſe *Orifices* as their being *Mouths*.

As to the *Firſt*; None, who have obſerved them, but muſt confeſs that they are often very turgid; as that I have by me 8 Yards long, at firſt did very plainly appear; and having put it into Spirit of Wine, I found after a little while it had muddied it, by ſpewing out a large Quantity of a chylous Juice, which made a deep Sediment at the Bottom; as likewiſe it did a ſecond Time, having changed the old, and put it in freſh Spirits. Whence all this ſhould iſſue, I cannot ſee, but by theſe *Orifices* at the Sides, which firſt I ſuppoſe had received, and licked it in: And being in ſo large a Quantity, how otherwiſe it could be well received into the Body, but by theſe many *Mouths*; which being always open, and lying of all Sides too, do greedily exhauſt and devour the beſt Part of the *Chyle* and nutritious Aliment. 2. That hence may be well accounted for, that *Appetitus Caninus*, that great Thirſt, that *Atrophy*, I mentioned in my *Second* Particular, and are often obſerved in thoſe that are afflicted with this *Worm*. But had they but one *Mouth*, how could they do this? But having as many, it may be, as the *Lacteals* themſelves, it is no Wonder that they rob them; and by their nimble ſupping it up, prevent its paſſing into them. That thence we muſt neceſſarily expect an Extenuation of our own Bodies, in Proportion to the Increaſe of theirs; ſince the Nouriſhment we receive is but what they leave us, and that too none of the beſt, and corrupted likewiſe with their Recrements. 3. I argue, That theſe *Orifices* are ſo many *Mouths*; for if we do not admit them to be ſuch, I know not where in the whole Body to find them beſides. For in that Part we call the *Head*, even our *Microſcopes*, as I have obſerved, cannot diſcover any; and thoſe too, that gueſſed it to be there, they all acknowledged it to be very ſmall; and it being ſo, and but ſingle too, I cannot ſee how it can take in ſo great a Quantity of *Chyle*, which would be neceſſary for maintaining ſo great a Body, of ſo great a Length: For it can lick up no more than what juſt comes in its Way; ſo that the open *Mouths* of the numerous *Lacteals* would be too hard for it, and quickly ſtarve it. Beſides, ſince it nuzzles its *Head* ſo deep in the Coats of the *Inteſtines*, at that time at leaſt, it may be thought incapable of getting ſcarce any thing at all. But the *Uſe* I have aſſigned that Part, I am apt to think, will ſatisfy others, as well as at preſent it does myſelf. Therefore, 4. Why I think thoſe Orifices *Mouths* is, becauſe I cannot think what they are beſides: For to take them for ſo many Vents of their Excrement would be more unreaſonable, ſince it is pure *Chyle* which they receive; which will not afford much, at leaſt ſo groſs an Excrement, as to need ſo many and large Orifices for the voiding it. And why ſo many *Anus's*, when but one *Mouth?* It is eaſier to imagine them *Bronchiæ*, or *Lungs*, which in Inſects are obſerved in all the *Annuli*, or *Joints* of the Body; but withal I muſt obſerve, with how much Difference from our Subject: For in them you ſhall conſtantly ſee theſe *Orifices* of both Sides in each *Annulus*, but in our *Worm*, never but of one Side; in thoſe they are not near ſo open, and large, as in this *Worm*, even ſo much, that I cannot ſee how it can be avoided, but that the *Chyle* muſt ſlip into them, and ſo ſpoil them for being *Lungs*; and indeed, what Uſe can we imagine of ſuch here, which muſt almoſt conſtantly be occluded, either by Filth or *Chyle*. If I miſremember not, by preſſing them gently with my Fingers when freſh and turgid, I obſerved *Chyle* to iſſue out of them. So that I think I have little reaſon to doubt that the *chylous* Sediment in the Spirit of Wine, I had immerged them into, came hence. Upon the whole, what I have here offered, I think, is ſufficient to render my Conjecture probable. And yet I have more Reaſons to add why theſe *Orifices* ſhould be *Mouths*; becauſe the *Joints*, when broken off, yet ſtill do live; and that too, as may be thought, for ſome conſiderable time; which they could not, unleſs they had *Mouths* in each, which might receive the Aliment for the Support of it. Which brings me to the laſt Particular I propoſed, for diſcriminating this *Worm* from all others out of the Body, and ſhall now diſcourſe of.

7. It has been ſtiffly maintained by Authors of great Note, both modern as well as the Antients, That the *Worm* itſelf ſcarce *lives*; and is only a *Spolium* of the *Inteſtine*, or at leaſt, it is not one, but many *Worms*, included in that Membrane. But ſuch Opinions ſeem wide of the Truth: For many Phyſicians have obſerved it to *move*, and therefore to be an Animal and *alive*. And a remarkable Inſtance I had of it, in that I met with upon Diſſecting of a Dog in the Theatre of our College; where I particularly obſerved the Manner how it performed its *Motion*, which was very pleaſing and in different Forms. For though all was performed by contracting and ſhortening the *Joints*; yet ſometimes it rendered the Body, that was flat, round and a *Cylinder*; other times it made a deep Hollow or Concave on one Side, and a Convex on the other; but moſt times there was a bellying out at the Edges, about the Middle of the *Joints*; and though that Part towards the *Head* was very ſlender, yet upon Contraction it would become as broad as the laſt *Joints*. This Contraction of the *Joints* I ſometimes obſerved, at ſeveral Places at the ſame Time at ſome Diſtance from one another, which muſt needs much advantage its progreſſive Motion; ſince being of ſo great a Length, otherwiſe it could make but ſmall Advance; which is

perhaps requiſite, that it may recover itſelf, when the Deſcent of the *Fæces* do drive it downwards. And for the Advantage too of its *Motion*, at every *Joint* there is a Prominence of the former over the latter; which, like ſo many Scales on the Belly of other *Reptiles*, do perform the Uſe of Feet.

But I find ſome Authors, who admit this *Worm* to be *alive*, yet aſſert, that it is not one, but many *Worms* linked together and included in a *Spolium* of the *Inteſtines*, and that this *Spolium* itſelf is not *animated*, but receives all its Senſe and Motion from the *Cucurbitini* included in it. This *Gabucinus* very plainly, as he tells us, diſcovered in a Part of this *Worm*, ſhewed him by a Perſon that voided it. *Hæc Portio*, ſays he, *ſeſe commovebat, quo factum eſt, ut avidius* Motus *ipſius cauſam veſtigarem; diligentiſſime tandem perquirens per ejus totam Cavitatem*, Cucumeris *ſimilium* Animalium *Seriem ſeſe* moventium *ipſi* Motum *præſtare conſpexi: Quæ ex ea, veluti ex quodam Lectulo, prodibant, interdum unum, duo ſimul interdum complicata, plerumque quatuor plurave: atque eam abraſionis portionem, quæ vacua ab hujuſmodi* Cucurbitinis *ſegmentis* Animatis *erat, nullo pacto* moveri, *imo ſubſidere.* But I very much ſuſpect this Particular, becauſe in that I met with in a Dog in the *College Theatre* whilſt *alive*, and in my Hand, a *Joint* or two fell off, but I could no ways obſerve any Membrane hanging to the foregoing *Joint*, out of which it might ſlip, but it broke off entire. And although there were two ſingle *Joints*, which I found in the *Inteſtine*, upon the firſt opening it, yet there was nothing I could ſee affixed to the laſt which might include them. And indeed the ſetting on of the *Joints* here is ſuch, that it ſeems to me ſufficient to ſhew, that this *Worm* cannot be a continued Membrane articulated only by the ſeveral *Cucurbitini* included in it, ſince there is ſo large a Protuberance of the lower Extream of the foregoing *Joint*, over the upper Part of the following; which I plainly perceived in this *Worm*. If only a Membrane, why conſtantly, and thus regularly, a Difference of both *Extreams*, as to their Length and Breadth? How happen the *Hooks* at the *Head?* How are thoſe *Orifices* formed at the *Edges*, or on the *Flat* of the *Worm?* And if it was ſo as *Gabucinus* imagined, I cannot think but I muſt have perceived ſomething of it in thoſe ſeveral Pieces of this *Worm* which I have obſerved, and eſpecially in that 8 Yards long, where I opened ſeveral *Joints*, and could find no ſuch Thing. That *mucous* Matter therefore which is obſerved to be voided by thoſe troubled with them, which he tells us the Women there take for the Beds of this *Worm*, may be better accounted for; it being likely in a great Meaſure to be but the *Mucus* of the *Inteſtines* themſelves, or a ſlimy *Spolium* caſt off from theſe *Worms*. Thus Leeches, I have obſerved, being put into Water, do caſt out a Slime, which covers their Bodies, which afterwards they ſlip off, and is found in the Bottom of the Glaſs in the Form of a mucous Coat. So Earth-worms do void a large Quantity of a mucous Liquor, at ſeveral Parts of their Body; ſo Snails, *&c.* Upon the whole, I ſee nothing why we may not juſtly aſcribe that *Life*, we find here, to the *Lumbricus Latus* itſelf, and not to any Animals we may fancy it pregnant with.

De Lumb. *Comment. n.* 3. *p. m.* 34.

And what I do give to the Whole, I muſt attribute likewiſe to the ſeveral Parts of it, even when ſeparated from the reſt of the Body; and cannot but think that they do *live* likewiſe: For, beſides thoſe Conſiderations, I have already delivered to prove that in every *Joint* there is a *Mouth* for receiving the Food (and no doubt anſwerable *Organs* for the *Digeſtion* and Diſtribution of it) I have alſo obſerved that both ſingle *Joints*, and often larger Pieces have been voided *alive*; and where vaſt Quantities of this *Worm* too have been voided at the ſame Time, in abundance of Pieces, I have obſerved them almoſt equally turgid, and alike filled with *Chyle* in Proportion to the Magnitude of the Parts. Now I cannot think, that in voiding, it can always be broken into ſo many Pieces; and if it be done ſome Time before, and they lie dead in the Body, they muſt be emacerated, and different from what they appear. But that Obſervation I have already often mentioned, of that *Worm* I met with in the Dog I diſſected in the *College Theatre*, does furniſh me with ſomething appoſite to our Purpoſe. For here, about the Middle of the *Worm*, as it lay in the *Inteſtine*, about a Foot and a Half from the *Tail*, or lower Extream, I obſerved two ſingle *Joints*, about three Quarters of an Inch long, *alive*, and which continued their Motion briſkly for three Quarters of an Hour, or more, in warm Water. That theſe were broken off from the *Tail*, I nothing queſtion, being in all Reſpects ſo like them; and that it muſt be done ſome Time before, I am apt to think, becauſe they were ſo remote from it. For they could not otherwiſe eaſily, being but ſingle *Joints*, make ſo great an Advance, being upon all Occaſions liable rather to be driven down, not being able, as I could obſerve, any ways to faſten themſelves, and ſo reſiſt the Force of the deſcending *Fæces:* Which is the Reaſon, when broken off, they are ſo frequently voided.

Upon the Whole, I have been ſometimes apt to think, what Analogy there may be between this *jointed Worm* and *knotted Plants*, of which each Joint can ſo eaſily propagate itſelf; and whether it may not be thought an *Animal*, *Plant-Animal*, or *Zoophyton*, bred in Animal Bodies; ſince ſo large and frequent Detruncations of the Body do not deſtroy the Life of the Whole; which I think can ſcarce be inſtanced in any Animal beſides.

Explication of the Figures.

Figure 16, repreſents a *Worm*, or rather Part of a *Worm*, voided by a young Man in *London*; which was eight Yards long. The leſſer Extream, is that Part towards the *Head*; the broader, the *Tail*. The Protuberances, about the Middle of the Edges of the *Joints*, are the Orifices I take for *Mouths*.

Fig. 17, a *Worm* I took out of a Dog, which was about five Foot long; and was *alive*. The ſmall End ſhews the *Head*; as it appeared then to the naked Eye. The two Protuberances at the Sides, are the *Mouths*. The broad End the *Tail*.

Fig. 18, I met with this *Figure* in *Franc. Sanchez*, which, though rude and plain, yet very well repreſents thoſe Orifices, which I take for the ſeveral *Mouths* of this *Worm*.

Fig.

ig. 130.

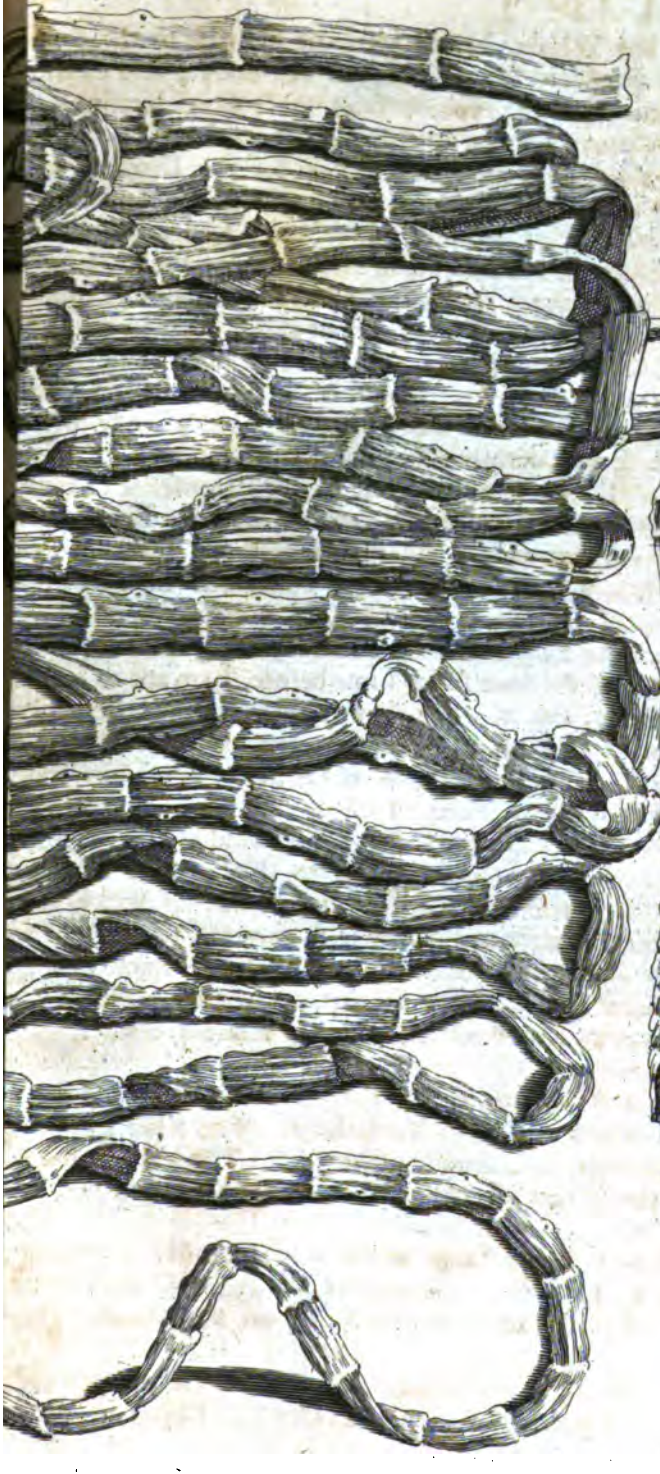
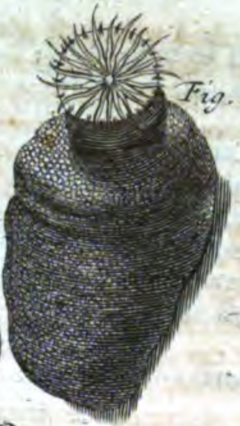


Fig. 20.



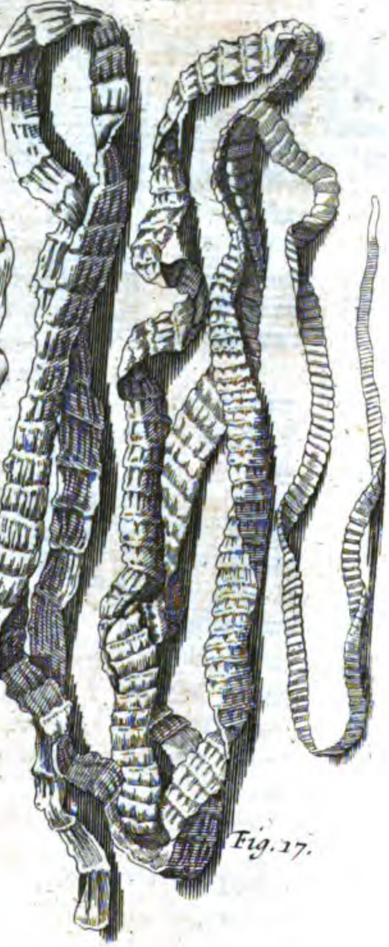


Fig. 17.

Fig. 19, repreſents the Protuberance or *Papilla* about the Middle of the Edges (as viewed with a *Microſcope*) and in it the Orifice which I take for the *Mouth* of this *Worm.*

Fig. 20, is the *Head* of this *Worm* (as it appeared in the *Microſcope*) in 3 ſeveral ones I took out of the Body, upon Diſſection; wherein is obſervable a double Order of *Spikes* or *Hooks*, the longer ariſing from the Center, the other more towards the Edges, which at pleaſure it can contract or protrude, and with them, part of the Neck too, as does appear by the Swelling out a little below, as it is very curiouſly delineated (as likewiſe the other *Figures*) by *Rich. Waller*, Eſq;

Fig. 21, a Side-proſpect of the *Head*, and the *Hooks* in it, of the ſame *Worm.*

The Lumbricus Teres; *by Dr.* Edw. Tyſon. *n.* 147. *p.* 154.

XL. That common *Round Worm*, which Children uſually are troubled with, is by *Hippocrates* named στρογγύλος; by *Celſus*, *Teres*. It is uſually about a Foot long; but the *Male* is generally leſſer than the *Female*: So that by their Bigneſs in the ſame Body, I have, before Diſſection, been able to diſtinguiſh the Sex. They are about the Bigneſs of a Wheat Straw, or a Gooſe Quill, and their Colour white. I did not obſerve thoſe *Feet* or Aſperities on the *Annuli*, as in the *Earth-Worm.* At both Extreams they grow narrow. Their *Mouth* is compoſed of three Lips; ſo the *Leech* hath three cartilaginous Teeth ſet in a Triangle, by which they make the Wound in the Skin in Suction. The *Anus* is a tranſverſe Slit a little before the extream Point of the *Tail.*

In opening the Body, I found I cut through a large Muſcle under the Skin: Which Muſcle in *Earth-Worms* I find is ſpiral, as in a good meaſure is their Motion likewiſe; ſo that by this Means, like the Worm of an Augre, they can the better bore their Paſſage into the Earth. Their reptile Motion alſo may be explained by a Wire wound on a Cylinder, which when ſlipped off, and one End extended and held faſt, will bring the other nearer it. So the *Earth-Worm* having ſhot out or extended its Body (which is with a Wreathing) it takes hold by thoſe ſmall *Feet* it hath, and ſo contracts the hinder Part of its Body. Likewiſe I obſerved, that dividing this Part, there iſſued out a copious *Ichor*; which is naturally diſcharged by ſome Pores, or ſmall Vents in the Skin; which in the *Earth-Worm* is of great Uſe, by rendering the Surface of the Body ſlippery, that ſo it might the more eaſily glide into the Earth. And in theſe other *Worms* of the *Inteſtines*, this Humour (as in *Leeches*) makes a Covering to the Body, which is often caſt off, and obſerved as a *Mucus* in the Stools of thoſe troubled with them.

Fig. 22, 23.

In theſe *Teretes* of animal Bodies, I never obſerved thoſe tranſverſe *Diaphragms* which are ſo numerous in *Earth-Worms*, and to interſect, or rather ſo deeply depreſs, the *Inteſtine.* The Paſſage from the *Mouth* was ſomewhat ſtraightened for a ſhort Space, and was diſtinguiſhed, as in the *Figures*, from the following *Ductus*, which was a ſtraight *Inteſtine* continued to the End of the Body, without any Winding or other Diſtinction of a Stomach, that I could obſerve. In the *Male* I obſerved a *Penis*, a *Veſicula Seminalis*, and a

Teſtis: In the *Female* a *Pudendum*, *Vagina Uteri*, *Cornua Uteri*, and *Spermatick Veſſels*.

In the *Male*, the *Penis* was placed at the *Tail*, or oppoſite Extream to the *Head*, and ſeemed to be able to exert itſelf almoſt the Length of a Barley-Corn, or proportionably to the Length of the *Vagina* in the *Female*: At the Root of the *Penis* was inſerted the Neck of the *Veſicula Seminalis*, which gradually grew larger as it aſcended in the Body, and uſually did reach almoſt half-way. It was filled and turgid with a *milky Juice*, which it received from a ſlender *Veſſel* of the ſame Colour inſerted into it; which after one turning, was afterward very much convoluted, and being ſo, forms that Body I call the *Teſtis*. And although this Part be ſo looſely contexed, as even to the naked Eye it appears but as a continued Veſſel, and may eaſily be unravelled its whole Length, which I meaſured was above a Yard, yet I make no Difficulty of giving it the Name of a *Teſtis*, ſince it was now ſufficiently known, that the *Teſtes*, in more compleat Animals, are only a *Congeries* of *Veſſels*; and a *Rat*, beſides this *Worm*, is not only the Subject wherein I have found them thus looſe and eaſily ſeparable.

In the *Female Worm*, almoſt about the Middle of the Body, but more towards the *Head*, I obſerved an Orifice or *Pudendum*; which led into the *Vagina Uteri*; which ſoon divided into the two *Cornua*, which were large and remarkable: For deſcending ſomething winding towards the *Tail*, they were then reflected again, and did each of them terminate in ſlender *Veſſels*, white as they were, but much ſmaller; and did lie in ſeveral Convolutions and Windings amongſt them. Theſe I take for *Spermatick Veſſels*. Having taken thoſe Veſſels, with the *Cornua Uteri* and *Vagina*, out of the Body, and laid them on a Paper to dry, I found from each *Cornu* to the End of the *Spermatick Veſſels*, which I had preſerved, that they meaſured above 4 Foot. I opened the *Cornua Uteri*, and found them turgid with a *milky Juice*: Having placed a little of it upon a ſmall *Microſcope*, I plainly perceived it was nothing elſe but an infinite Number of ſmall *Eggs*, though to the naked Eye it appeared only as a fluid Body. Theſe *Eggs*, when freſh, appeared as is repreſented in the *Figure*, covered with abundance of ſmall Aſperities; but as they grew dry, their Surface appeared ſmooth. By comparing that ſmall Quantity I did obſerve, in which I could diſtinguiſh ſo many *Eggs*, with the whole Subſtance contained in both the *Cornua*, I cannot gueſs there can be ſo few as 1000 *Eggs* in each *Female Worm*. *Fig.* 25.

De Anima Brutorum, c. 3.

How far different this *Worm* is from common *Earth-Worms*, as to theſe Parts, I need only refer to Dr. *Willis*'s Figures and Account of it to ſhew: And I am yet to learn what *Worm* out of the Body has theſe Organs thus formed: When once there, the Caſe is plain how they propagate themſelves, ſince the Diſtinction of *Sexes* is ſo evident: So that they are much miſtaken who ſay, that theſe *Worms* do not generate. And I cannot but think, that they are alſo miſtaken who make them *Viviparous*; and that they were impoſed upon by the *Genital* Parts of this *Worm*; which not warily examined, might eaſily make them to think they are ſo many ſmall *Worms*: For they are not *Viviparous* but *Oviparous*, as I have ſhewn; and their containing ſo vaſt a Number of *Eggs* in the *Cornua Uteri*, as I have expreſſed, does ſufficiently account for that prodigious Quantity, that are ſometimes obſerved to be bred in animal Bodies. And were it not that the greateſt Part of the Litter of this *Worm* is uſually carried forth by the *Fæces*, it could not be avoided but we ſhould be devoured by ſuch a *multiparous* Enemy, which we breed in our own Bowels. That Caution therefore of *Henr. ab Heers*, I think is neceſſary, to avoid the giving the Powder of theſe *Worms* for expelling others, ſince we cannot be ſecure, but that at the ſame Time we may ſow the Seed for propagating more. *Obſ.Med. l. 1. Obſ. 9.*

Explication of the Figures.

Fig. 22, repreſents a *Male-Worm* opened. *a*, Shews the 3 *Lips* of the *Worm*. *b*, The *Oeſophagus*, or Gullet. *c c c*, The large *Inteſtine*. *d*, The *Penis*. *e e*, The *Veſicula Seminalis*. *f*, The *Teſtis*.

Fig. 23, a *Female-Worm* opened. *a*, The *Mouth*. *b*, The *Gullet*. *c c c*, The *Inteſtine*, or Gut. *d d d d*, The two *Cornua Uteri*. *e*, The *Vagina Uteri*. *f f f*, The *Spermatick Veſſels*. *g*, The *Anus*.

Fig. 24, the *Genital Parts* of the *Female Worm* explicated. *a*, The *Pudendum*, or *Foramen*, as it appears on the Outſide of the Skin. *b*, The *Vagina Uteri*. *c c*, The two *Cornua Uteri*. *d d*, The *Spermatick Veſſels*.

Fig. 25, the *Eggs* of this *Worm*, as they appeared, being viewed by the *Microſcope*.

Lumbrici Teretes *found in an ulcerated Ankle; by Dr.* M. Liſter. *n.* 95. *p.* 6064.

XLI. In *Apr.* 1673, a Chirurgeon at *York* brought me about 20 *Worms*, which he had juſt taken out of an ulcerated Ankle of a Girl of about 8 Years old. She had been in great Miſery for ſome Months; and had been ſent up to *London*, where ſhe was touched and dreſſed for the *Evil*. Some Time after her Return, her Pain continuing, a young Puppy was opened and applied to the Sores. The Chirurgeon, who took off the Puppy, found it, to his great Admiration, full of *Worms*, at leaſt 60 in number, what with thoſe he found in the Body of the Puppy, and what he drew out of the ſore Ankle; into which, he ſaid, they crawled down as *Worms* do into the Ground. The ſame Puppy was again applied, and at the ſecond taking it off I made her a Viſit. I found the Leg ſound all but the Ankle, which was vaſtly ſwelled, and the Girl otherwiſe hearty and well-coloured. I ſaw only one *Worm* got out into the Puppy, but a very live and ſtirring one: Many were afterwards killed by Injections. Theſe *Worms*, I affirm, according to my beſt Knowledge (and I had the Opportunity of comparing them) were of the very Species of the *Lumbrici Teretes*, which Children familiarly void from the *Guts*. They were betwixt 3 and 4 Inches long; all, about the matter, of an equal Bigneſs, as of one Brood, ſomething thicker than a Duck's Quill; very ſharp at both Ends, ſtiff, and exactly round; without Inciſures, viſible at leaſt, and yet could move and twiſt themſelves readily enough. All the Difference was in the Colour, theſe being much whiter than any I have ſeen from the *Guts*.

A Remedy for Worms *in Children; by Sir* Theodore Mayern. *n.* 211. *p.* 164.

XLII. The Sugar, or Remedy, given by *Ponteus* (a famous *Chymical Mountebank*) for *Worms* in Children, is 15 *Gr.* of *Mercurius Dulcis*, with 5 *Gr.* of *Scammony*, and 2 or 3 times as much *Sugar*, made up in *Lozenges*.

He ſays, that this *Doſe*, which in *France* purges grown Perſons, does nothing here in *England* on thoſe above 15 Years old, and ought to be augmented.

His *Mercurius Dulcis* is made without *Vitriol*, which, though good, is yet corroſive; he takes only Aſhes with decrepitated Salt.

The Lumbricus Hydropicus; *by Dr.* Edw. Tyſon. *n.* 193. *p.* 506.

XLIII. In the Diſſection of a *Gazella*, or *Antelope*, brought from *Aleppo*, I obſerved ſeveral *Hydatides*, or Films, filled with limpid Water, about the Bigneſs of a Pidgeon's Egg, and oval, which were faſtened to the *Omentum*, and ſome in the *Pelvis*, between the *Bladder of Urine* and the *Rectum*. I had before met with the like watery Bags, or *Hydatides*, in other Animals, and I ſuſpected them to be a particular Sort of Inſect bred in animal Bodies, or at leaſt the Embrio's or Eggs of them: 1. Becauſe I obſerved them included in an outward Membrane, like a *Matrix*, ſo looſely, that by opening it with my Finger or a Knife, the inward *Bladder*, containing the *Lympha* or *Serum*, ſeemed no where to have any Connexion or Hold to it, but would very readily drop out, ſtill holding its Liquor, without ſpilling any of it. 2. I perceived, to this inward *Bladder* there was a Neck, or white Body, more opake than the reſt of the *Bladder*, and protuberant from it; but ſo as I could obſerve an Orifice at the Extream of it, which then to me ſeemed to be occaſioned by the Retraction of ſome Part of it inwards. By this I fancied it might, as by a *Mouth*, ſuck the *Serum* from the outward Membrane, and ſo ſupply its Bladder or *Stomach*. 3. Upon approaching this Neck to the Candle, we found that it did really move, and then ſhorten itſelf. Mr. *Richard Waller*, being preſent at the Diſſection, made theſe Figures of it.

Explication of the Figures.

Fig. 26, repreſents one of theſe watry Bladders, incloſed in its outward Membrane or *Chorion*; its Shape was almoſt round, only flatted as a Drop of Quickſilver will be by lying upon a Solid. *a*, Shews the Neck, ſeen through the Membrane, which in

Fig. 27, is more plainly repreſented (the outward Membrane being taken off) but as appearing to the naked Eye; where we may obſerve an open Orifice at the Extream of it, and that it is made of circular Rings or Inciſures, which in

Fig. 28, being viewed by a *Microſcope*, do more evidently diſcover themſelves. This Part is granulated with an Abundance of fine Eminencies all over. The *Orifice* at the End ſeems here to be occaſioned by drawing itſelf inwards, and upon Trial we found it ſo, for in

Fig. 29, is repreſented the Neck of this *Worm*, drawn out its whole Length, and magnified; where may be obſerved the leſſening of the Rings, and its tending to a Point at the End. And having opened it, within we found 2 ſmall *Strings*, *a a*, proceeding from the Neck, and floating in the Liquor.

What theſe two *Strings* may be, is hard poſitively to aſſert: Leaving others to their own Conjectures, I ſhall deliver mine. That this *Worm*, by protruding its Neck, ſucks from the outward Membrane (which involves it, and is furniſhed with Blood-Veſſels) the Moiſture, or Nouriſhment, which is conveyed by theſe two *Strings* or Pipes into the Stomach or Bladder, and from whence, as there is Occaſion, it may be ſupplied for the nouriſhing the whole Body of the *Worm* again; for I am apt to believe, this Bladder is but the *Stomach* of the *Worm*; which will appear leſs unreaſonable, if we conſider in ſome Inſects how prodigiouſly large the *Stomach* is in Proportion to the other Parts of the Body; in a *Leech* you may obſerve not a ſingle, but above 20 *Stomachs*, emptying out of one into another, and running the whole Length of the Body. And what *Malpighius* obſerves of the *Silk-Worm*, that it would devour in one Day as much as the Weight of its whole Body, a *Leech* will do far more at a Meal. *De* Bombice. *p.* 40.

Some, it may be, will be more inclined to think, that the Whole is but an Egg, or *Embrio* of another Inſect a forming, and that this Bladder is as it were the *Amnion*, and the outward Coat that includes it in the *Chorion*. But formerly, in diſſecting a rotten Sheep, wherein I found many of theſe *Hydatides*, and opening ſeveral of them, I could not obſerve but the ſame Structure exactly in all; and doubtleſs, had they been indeed *Embrios*, I ſhould have met with ſome nearer to Perfection. Theſe *Hydatides*, therefore, I cannot but think, are a Sort of *Worms* or Inſects *ſui generis*; and becauſe they contain ſo much Water in them, and are uſually to be met with in rotten Sheep, which are *Hydropical*, I call them *Lumbrici Hydropici*.

But I do not think that all thoſe *Ciſts*, to be met with in morbid Bodies, are of this Sort; for in ſome I have not obſerved this *Neck* and Structure of Parts, but only a tranſparent Bladder filled with a *Lympha*. Thus, about 10 Years ago, I opened the Right Side of a Patient, a little below her ſhort Ribs, and there iſſued out Abundance of limpid Water, and together with it a great many *Hydatides*; that firſt and laſt, as we gueſſed, there might come out about 500 of theſe Bladders: Moſt were entire and filled with limpid Water; of others, that were too large for the *Orifice*, the Films were broke; but in none of them could I obſerve the *Neck*, though I was inquiſitive to find it; which makes me think them to be different from our preſent Subject, as are likewiſe thoſe I have frequently met with in the *Ovaria*, or Teſticles of Women, who have died Hydropical, which I take to be only the *Eggs* contained th[illegible], which by an extravagant Flux of Humours into them, are often ſwelled to that prodigious Bigneſs, that I have taken ſometimes ſeveral Gallons of Liquor out of them. And thoſe Bladders of Water found in the Urine-Bladder of Mr. *Smith* of *Highgate*, will come into the ſame Number, having obſerved no *Neck* in any of them. *Vide Inf. Sect.* LVI.

I ſhall only add, That theſe *Lumbrici Hydropici* I have always found hanging to the membranous Parts, rather than included in the Body of any of the the *Viſcera*, as to the *Omentum Peritonæum*, or the outward Membranes that cover the *Diaphragm*, *Stomach*, *Liver*, *Colon*, or other *Inteſtines*.

A Worm *voided by Urine; by Mr.* Matthew Milford. *n.*140.*p.*1009. *By Mr.*Ent.*ib.*

XLIV. 1. The *Worm*, when I voided it, which was at the ſecond Urine, was then alive: It was Snake-headed, of indifferent Subſtance in the Middle, and ſmall at the Tail; in Length above Half a Yard. I was very ill before it came from me, and have ever ſince unrined a Kind of Blood.

2. It is moſt probable, that he had a Suppreſſion of Urine for ſome Time, at the firſt making whereof, the *Worm* was voided from one of the *Kidneys* (wherein it was bred) into the *Bladder*; and at the ſecond, from thence into the Pot. It was (being dead and dry) of a dull red Colour, and in Thickneſs about the 12th of an Inch.

Animals vomited by a Child at Sheffield; *by Mr.* Jeſſop. *n.*117. *p.* 393.

XLV. 1. A Girl in *Sheffield*, about 8 Months old, was ſurprized with violent vomiting Fits, which held her for about a Week, and made her ſo weak, that her Parents began to deſpair of her Recovery. They at length ſent for Mr. *Fiſher*, who chanced to ſay, *Wormwood* was good for the Stomach. He going Home to fetch Things proper on that Occaſion, they, in the mean Time, offered her ſome *Wormwood-Ale*, which ſhe took ſo greedily, that ſhe ſwallowed down a Pint of it. And at his Return, ſhe vomited up in his Preſence 3 *Hexapodes*, all very active and nimble. The Girl, in a ſhort Time recovered, and was well. Mr. *Fiſher*, in the Afternoon, brought the *Hexapodes* to me; we killed one of them with trying Experiments upon it; but gave either of the other two the Head of a ſhining *Atricapilla*, which, in about 5 Weeks Time, they eat up, Bones, Feathers, and all, except the Extremities of the Feathers, and the Beaks. I then gave them a Piece of *Laurus*; but that, it ſeems, agreed not ſo well with them, for they died within 2 Days.

By a Child near Rippon; *by Dr.* Liſter. *ib. p.* 394.

2. A Son of Mr. *B.* living not far off *Rippon*, about 9 Years of Age, in *Feb.* 167$\frac{4}{5}$, was afflicted with a great Pain in his Stomach, and continual Vomitings. A Powder was given, wherein was a ſmall Quantity of *Mercurius Dulcis*. He thereupon vomited up ſeveral ſtrange *Worms*, two of which were brought to me at *York*, the one dead, the other alive, and which lived many Days, till I put it into Spirit of Wine, to preſerve it in its true Shape. Theſe *Worms* were very *Caterpillars*, with 14 Legs, *viz.* 6 ſmall, pointed; the 8 Middle, Stumps; and the two hind, Claſpers; ſomething more than an Inch long, and of the Thickneſs of a Duck's Quill, thin haired, or rather naked, with brown *Annuli*, and a black Head; the very ſame, for Kind, that I have many times ſeen on Plants; and, no doubt, theſe (as thoſe others) would, in due Time (if the Place had not hindered) have ſhrunk into *Chryſalis's*, and changed into *Moths*. As alſo thoſe, mentioned by Mr. *Jeſſop*, would have changed to *Beetles.*

By a Man at York; *by Dr.* M. Liſter. Ph. Col. *n.* 6. *p.* 164.

Fig. 16.

3. A Baker at *York*, in *March* 168$\frac{1}{2}$, vomited up a *Worm:* I found it in the Blood which came up with it, having cauſed it to be waſhed, for the more careful Examination of it, much of the Blood being Clods of a Kind of Skinny and fleſhy Subſtance, *haud aliter quam in Mulierum Molis excernendis accidere ſolet*. Of this Kind of Blood there was about 2 Pound Weight ſaved in the Waſhing, and this odd Animal amongſt it. It was a dark green Colour, like a Horſe-Leech, and ſpotted not unlike ſome of them: I could per-

ceive (when I found it) no Life or Motion it had; the Girl that waſhed the Blood having almoſt beaten off a Fin, and Part of one of the Forks of the Tail, and burſt the Belly of it; yet it was curiouſly and regularly ſhaped in all its Members. The honeſt Man imagined he drank it the Summer before in pond-water, of which he was uſed to drink after ſore Labour in his Calling. This is certain, he had about his Stomach and Right Side a moſt exquiſite and tormenting Pain for at leaſt 4 Months, which many times threw him into Horrors and Chilneſs, Ague-like; and, indeed, when he vomited this up, he was the ſickeſt Man I ever ſaw, not to die. He alſo voided Blood by Stool ſeveral Days.

I am at a Loſs where to place this Animal; for that it is not like any Thing I ever yet ſaw in Nature. It was about 4 Inches long, and in the thickeſt Place 3 Inches about; it had 3 Fins of a Side, all near the Head, and all of them were thick and fleſhy; but the forked Tail was finny and tranſparent, and to be extended: It was placed horizontally, not as that of moſt (if not all) ſmall Fiſh, and even *Neuts* and *Tadpoles*, or Frogs in Diſguiſe, in which Particular it differs from them all, as well as in the Fleſhineſs of the Fins.

Beſides this odd Animal, I found the Head of another of a different Shape, but of the like dark green Colour.

I am apt to think, that we often drink and eat what is alive; and it is certain ſome Things will live on in our Stomachs, in deſpite of Concoction; not to inſtance in the many Sorts of *Gut-worms* natural to us, and which are bred within us, perhaps in ſome Children even before they are born: Theſe *Worms*, I ſay, do freely wander up and down the *Guts* and *Stomach* at their Pleaſure, and receive no prejudice from the concoctive Faculty of them. And for this Reaſon we ſee *inſectivorous Birds* ſo ſollicitous to kill *Worms*, and all other Sorts of *Inſects*, by drawing them again and again through their Bills, as Canes through a Sugar-Mill, that they may be verily dead before they ſwallow them. And yet I am of the Mind, that what was accidentally ſwallowed by us alive, and that ſhall have the Power to live on within us (eſpecially if it ſhall be young and tender, and yet growing) may have its deſigned Form and Shape monſtrouſly perverted, ſo as to appear to us quite another Thing than naturally and really it is; and this I take to be the Caſe of this odd Creature, which might have been the Spawn or *Embrio* of a Toad or Neut.

The ſkinny Lumps of Blood, vomited up with it, I think may be eaſily accounted for. For this Spawn or *Embrio* of a Toad or Neut might well venom the *Stomach* or Gut, in which Part ſoever, or Wrinkle thereof, it chanced firſt to reſt or ſtick, and cauſe an Inflammation there, and ſo have itſelf ſwelled or cloſed up within a Tumour of its own making, which, in Proceſs of Time, might gather to this Bigneſs; and at length, burſting in Pieces, come up together. Familiar and infinite Inſtances of this Nature we ſee in *By-fruits*, or Wens, which Inſects raiſe upon Vegetables; which, by natural Inſtinct, know how to invenom a Plant, and ſo compendiouſly to provide both Food and Houſing for their Young.

An Account of Worms *found in ſeveral Parts of the Body; by Mr.* Tho. Dent. *n.* 213. *p.* 213. Mem. *for the Ingenious.* July, 1693.

XLI.VI. The chief Cauſe of thoſe riſing Tumours fixed upon my Tongue, is at laſt diſcovered to proceed from the Diſeaſe of Worms. *M. de la Croſs*, in his *Memoirs*, having mentioned ſome Cures of this Diſeaſe of Worms, by one *Sarah Haſtings*, who was very famous in the Diſcovery of them in the Face, Gums, Tongue, and which ſhe managed with ſuch dexterous Art in the Operation, that ſhe took them out of any Part affected with a Gooſe-Quill; one of which being in ſome Reſpects like to my Caſe, I was the more curious and ſollicitous to enquire out, if there were any of the Worm-Doctreſſes now in being; and hearing of one famous at *Leiceſter*, I was reſolved to write to her, deſcribing all the Symptoms as plain as I could explain them; to which I had a Return, that ſhe believed my Diſeaſe to be Worms: And being reſolved to try the Experiment, I took Coach for *Leiceſter*, where being come, my *Doctreſs* (Mrs. *French* by Name) no ſooner inſpected the Place, but inſtantly declared her Opinion that the Diſtemper proceeded from Worms. The next Day ſhe fell upon her Operation, which was performed in the Preſence of two Aldermen of the Town, Mr. *Gibbs*, my Lord of *Derby*'s Chaplain, and ſeveral others, when piercing the Parts affected with a Lancet, ſhe drew ſome Blood, and ſoon after, with a ſmall Spatula, and another Inſtrument with which ſhe opened the Orifices, ſhe picked out 5 or 6 Worms at a Time, ſome of which I have here ſent to you for your more curious Obſervation. She plainly ſhewed them to the Spectators as they came out of the Fleſh; they were all alive, and moved their Heads, ſomewhat leſſer than ordinary Maggots. I can tell you, that in leſs than 8 Days ſhe took out of my Tongue more than an hundred Worms, all almoſt of the ſame Bigneſs, except two very large ones, which (ſhe told me) were of a *cankerous* Production. She took more than 30 out of my Gums, which laſt Operation is her ordinary or daily Practice; Perſons of good Note reſorting to her from all Parts of the Country thereabouts. I was very curious to enquire out what Cures ſhe had done of this Nature; and I found a very ſatisfactory Account from Perſons of ſome Quality and Note. And, to be ſhort, though the Operation was very ſurprizing, and ſo will, I ſuppoſe, ſeem to you incredible; yet neither I, nor any one preſent could diſcover any Fallacy, but all the plain Dealing that ocular Demonſtration can admit of, to prove the Reality of the Operation; which I myſelf ſaw her perform upon ſeveral Patients while I was at *Leiceſter*. I ſhall not enter upon a philoſophical Reaſoning about the Nature or Production of theſe Animals; but I think the Cures this Woman performs, in picking out theſe Worms from all putrefactive Ulcers, Tumours and Sores, whether in the Faces, Noſes, Gums, or Tongues of ſeveral Perſons, prove that ſuch Animals are generated in thoſe Parts. I have received ſome ſenſible Good, and hope to have more Relief by her next Operation.

Further confirmed; by Mr. Mark Lewis. *ibid. p.* 122.

2. She put the Caſe beyond all Diſpute: (1.) By ſhewing me the Head of the Worm in the Orifice before ſhe extracted it. (2.) He was ſtill ſenſible of their Approach before ſhe could ſee them. (3.) She deſigned, what he intended to have done, that an Inciſion ſhall, when he comes to Town, be

made in the Place, that if Worms be not then found, ſhe may then be well ſpoken of.

To me ſhe gave a Catalogue of ſeveral Cures ſhe had done in the Town and Country, one was my own Relation, I know to be a Truth.

Thus far we went over Night; ſhe took 15 or 16 Worms out next Morning. I found Mr. *Newton* deſirous to ſee the Operation: He was a Stranger to us both; but we complied with his Deſire: Were extreme glad of his Company, when he told us it was on your Account.

He took the ſame Care I had done, ſaw the ſame Effects I had done over Night, only now there was not above 10 Worms; they came by two at a Time, once, as I remember, three.

I deſigned to have ſent you ſome to compare with yours; told her of the Fraud my Friend, Mr. *Popple*, had detected in the *Stamford-Worm*.

I had provided ſome ſoft Cotton in a ſmall Box, but why, I know not; they now all died the ſame Day before I was got Home, when as formerly I had kept them 14 or 15 Days; they had faſted three Days before I had them.

I had the Curioſity to try whether I could find any Blood in them, but did not; which makes me think they feed of the ſame Humour they are bred of.

The Long Worm in the Fleſh in the Eaſt-Indies; *by*——*n.* 225. *p.* 417.

XLVII. A few Days after my Arrival at *Fort St. George* in the *Eaſt-Indies*, the Fruits of my *Gomroon* Journey ſhewed themſelves; for a little below the Inſtep of my Left Foot, a Worm put out his Head, which afterwards coſt me much Trouble. Theſe Worms are bred by the Water, between *Gomroon* and *Schiraz*, eſpecially that about *Laur*; they come out in any Part of the Body, and are very troubleſome and dangerous; for I have known thoſe who have kept their Bed for them, ſome 6, ſome 10 Months, and ſome there are, who have loſt ſometimes their Legs, ſometimes their Lives by them; they come out ſometimes to the Length of 6 or 7 Yards. When they firſt come out, they are ſmall, like a Thread, and afterwards grow bigger and ſtronger by Degrees; they wrap them up upon a little Bit of Stick or Cotton, and put upon them Onions and Flower of Rice boiled in Milk. The chief Care is to be taken not to break them, for then it is that they do Miſchief. When mine firſt came out, for about 40 or 50 Days it came out every Day by little and little, without putting me to much Pain, but that I could go up and down till it was come out about a Yard and a Quarter; but afterwards, one Day ſtirring too much, I hurt the Worm and enraged him, ſo that he broke off of himſelf, and going in, cauſed my Foot and Leg (up to the Calf) to ſwell till the Skin was ready to burſt, which kept me ſleepleſs, and caſt me into a *Fever*. I had a Chirurgeon, and kept my Bed for about 20 Days, in which time I had ſeveral Fits of the ſaid *Fever*; the Worm was broke to Pieces, and came out in ſeveral Parts of my Foot; but the Chirurgeon applied ſuch Things as killed the Worm, and turned it to Matter; he then lanced my Leg a little above the Ankle, and another Place of my Foot, and ſo with Drawing-Plaiſters drew it all out.

Obſervations on a Man who died of a Dropſy; *by Dr.* Nath. Fairfax. *n.* 29. *p.* 548.

XLVIII. A certain *Serving-Man*, about 27 Years of Age, died *Hydropical*; which Diſeaſe he was moleſted with 4 Years before his Death. He was ever a *liſtleſs*, dull, and melancholy Fellow, never cheerful nor ſmiling, eſpecially for 10 Years before he died. His Words came from him as if forced, and ſpeaking but a little, he would end with a Sigh. When opened, he was found to have the Left *Lobe* of the *Lungs* almoſt quite waſted; but no Ulcer, or ought preternatural, appearing in the remaining Part, except waſting. The Heads of the Veſſels and Branches of the *Wind-pipe* as big as in the other *Lobe*. That *Lobe* of the *Liver*, which buts on the *Midriff*, was black outwardly for about a Hand's breadth, and about a Thumb's breadth within the *Parenchyma*.

A Dropſy *miſtaken for* Gravidation; *by Dr.*—— *n.* 106. *p.* 113.

XLIX. Some Years ſince, there came to a Phyſician in *Holland* a young Woman of about 17 Years of Age, unmarried, and reputed a Maid, of a florid Countenance and ſtrong Body, having a good Stomach, *periodicè Menſtruata*, and wanting none of her due Evacuations, nor troubled with Head-ach nor Sleepineſs, nor Difficulty of Breathing, nor Drought, nor any of the Symptoms incident to *Hydropical* Perſons. This young Woman having her Belly ſwollen to exceſs in 3 Months time, was much ſuſpected by the Phyſicians, as if ſhe had been deflowered, which yet with many Imprecations ſhe denied. And indeed the *Tumour* of her *Belly* being felt, afforded ſome conſiderable Signs to diſpoſſeſs him of the Opinion he had of her; ſeeing it was not a prominent nor roundiſh *Tumour*, nor any ſuch as is uſual in *Women with Child*; beſides that, ſhe made not ſuch a coloured and craſs Urine as *Child-bearing* Women are wont to do; yet there appearing no Symptoms of a *Dropſy*, no Complaints of the *Stomach*, *Liver*, *Spleen*, *Kidneys*, no Swelling of the Loins or inferior Limbs, no Leanneſs in the Body or ſuperior Parts, no flaccid or diſcoloured Breaſts, but all being thus far in a good Conſtitution, he ſent her away without preſcribing her any Phyſick. After more than 6 Months, having conſulted with other Phyſicians and ſome Mountebanks in vain, ſhe returned to him. He now found her Body dried and bloodleſs, her Breath ſhort, her Temples fallen in, her Noſe ſharp, her Eyes hollow, her Skin wan and ill-favoured, her Pulſe creeping, her Appetite proſtrate, her Tongue dry, her Voice weak, her Evacuations ſparing, and all her Strength dejected; in a word, liker a *Skeleton* than a living Body. He being now ſufficiently convinced of the Nature of her Diſtemper, though the Caſe was deſperate, reſolved upon the Uſe of a *Paracenteſis*, or Inciſion. But the Patient abhorring this Operation, ſhe was left to herſelf, and died three Months after. Her Body being opened, there ſoon appeared a great Lake of Water; whence at firſt it ſeemed to be a common *Aſcites*, a Tumour of Waters ſtagnating in the *Abdomen*. Then the *Liver* being looked after, it was no where ſeen; the *Meſentery*, *Pancreas*, *Spleen*, and *Kidneys* did not appear: The *Peritonæum* was turned into a Bag, by a Separation made of its interior Membrane from its exterior, and ſo encloſing within it the whole Bulk of that reſtagnant Water, that not a Drop of it had been able to get out into the *Abdomen*. This coſt no ſmall

Trouble to render it conſpicuous, by empting this Sack of all the *Serum*, and ſo diſcovering both Sides of the Bag, made up of the double *Peritonæum*, whoſe inner Skin had been ſever'd from the outer, ſticking to the tranſverſe Muſcles of the *Epigaſtrium*, the *hydropical* Waters having forced the inner Membrane inwards into the Hollow of the *Abdomen*, and ſo forming it into the Shape of a Bag, whoſe Compaſs reached from the *Pubes* into the *Diaphragm.*, and from the Left Region of the Loins to the Right; ſo that the nervous Body of the *Peritonæum*, which is naturally as thin as a ſilken Web, being here thicker and cloſer than any Ox Hide, was, by little and little, expanded, as the Capacity of the Womb in *Gravidation* is ſtill more and more enlarged. This Bag of the *Peritonæum* being removed, the *Viſcera* came to view, which were not gravelly, nor tartareous, nor chalky (as they often are in *hydropical* Bodies) but only decayed and colourleſs: Which Decay, by the timely Uſe of an *Inciſion*, might have been prevented.

Obſervations on a Maid who died of an Aſcites; *by Mr.* J. Turner. *n.* 207. *p.* 15.

L. As the Body lay along, we perforated the *Abdomen* in the moſt prominent Part, by a *Paracenteſis*, and extracted the contained Liquor through a ſmall *Cannula*, to the Quantity of 3 Gallons: Afterwards we laid the Corps upon a Table, in the ſame Poſture, where we made Inciſion, beginning between the *Umbilicus* and the *Cartilago Enſiformis*, dilating ſtill as we emptied, till we had made room for a Quart Pot, with which we drew out, to the Number of 76 good meaſured Quarts (including the 3 Gallons extracted before) of a ſubſaline, and ſomewhat auſtere *Serum*, beſides what was imbibed with our Spunges, not improbably 2 Quarts more. After the Drying up the Reſidue of this Humour (which in Colour and Conſiſtence did ſomewhat reſemble Water, wherein Fleſh newly killed had been waſhed, ſaving that it was of a ſomewhat deeper Red, and had a more craſs *Hypoſtaſis*) we plainly perceived that the whole Bulk of this ſo ponderous a Deluge, was bore up and ſuſtained between the *Cutis* and *Peritonæum*; whereby there was made a very great Compreſſion of the *Inteſtines*, and other *Viſcera* to the *Vertebræ Lumborum* and *Os Sacrum*. The *Muſculi Recti* of the *Abdomen* were to my Apprehenſion quite obliterated, or, at beſt, not to be diſtinguiſhed from the *carnous Pannicle*, or common Tegument of the Body; when at the ſame time the outward Covering or *Cutis* itſelf (notwithſtanding ſo vaſt and powerful a Dilatation) was full as thick as in a ſound Body, in ſome Places much thicker. In the *hypogaſtrick* Region, the *Membrana Adipoſa* was obſerved to be above 2 Inches thick, and ſeemed to be no other than a *Congeries* of little *Bladders*, each of them contained in its proper *Capſula*, and implete with a coagulated *lymphatick* Juice. The grumous Part of the Blood in the *abdominal Veſſels* had been thrown forth in many Places, and adhered in great Clots to the Membranes. The Thighs, Legs, and Feet, were *anaſarcous*, and ſo extreamly elevated with a watry Humour, that, upon a ſtrict Impreſs, I could have buried 3 or 4 Fingers: And yet her upper Parts, as the Neck, Face, Arms, and Hands, were wonderfully emaciated.

The *Omentum*, or *Kell*, was wholly and abſolutely waſted away; the *Inteſtines* were only vitiated in their Colour, which was ſomewhat pallid, as if they had been ſeethed: Alſo the *Ventricle*, *Pancreas*, *Liver*, *Spleen*, *Kidneys*, &c. looked all of them like Fleſh half boiled, and the Blood abſorbed: For although none of theſe *Bowels* did ſwim in, or communicate with the *Serum*, being ſeparated by the aforeſaid Membrane, yet the great Nearneſs of the ſuperincumbent Liquids, had polluted and tinged the external Coats of the *Viſcera* with their preternatural as well as putrefactive Heat.

The *Inteſtines* were all of them diſtended with *Flatus's*, particularly the *Cæcum* was blown up to a very conſiderable Bigneſs. In the *Colon* and *Rectum*, ſome of the Excrements were contracted like little Balls, and as hard to bear any Impreſſion, through the Coats of the Gut, as a Stone. The *Liver* was no more faulty than the reſt of the *Bowels*. The whole Body of the *Spleen* adhered to the *Peritonæum*, but eaſily to be ſeparated from it. We could not diſcover in the *Kidneys* any Impediment or Let to the Secretion of the *Serum Sanguinis*, in caſe any Attempt had been made upon thoſe Parts by a *Criſis*. The *Veſica Urinaria* was empty, and of a more than ordinary Smallneſs. The *Ventricle* was filled only with Wind, like to a blown Bladder.

The *Diaphragm* was ſo forcibly impelled upwards into the Cheſt, that its *Diaſtole* muſt needs be very obſcurely aſſiſtant to *Reſpiration:* It was indeed ſo far contracted, that its convex Part bore hard againſt the *Lobes* of the *Lungs*, whoſe Subſtance, as I have ſeen in ſome that have died *tabid*, was very much decayed and periſhed, and looked juſt like parboiled Fleſh. In cutting open the *Heart*, I did not perceive the leaſt Drop of Water to fall from it: By which it may be juſtly thought, that the *Pericardium*, or *Capſule* of the *Heart*, being altogether deſtitute of its refrigerating Liquor, clung immediately to the proper Tunick of the *Heart* itſelf; upon cutting through whoſe *Ventricles*, we could not perceive one Drop of Blood, no more than in the reſt of the *Bowels*; and the *Liver* itſelf was deſtitute of ſo much Blood, as might be thought neceſſary for its own proper Nouriſhment, and yet its ſalino-ſulphureous Particles, which conſtitute the *Gall*, were depoſited into the *Veſica Bilaria*, to the Quantity of about a Spoonful. I obſerved a very large Protuberance of the *Coſtæ* and *Sternon*; which perhaps might be occaſioned from the rarified Effluvia of the Waters, pent up within the Breaſt, or rather a neceſſary Conſequence of the *Diaphragm*'s being ſo exceſſively preſſed upwards.

I ſhall not take upon me to determine, whether the contained Liquor happened from any Rupture in the *lacteal* or *lymphatick Veſſels*, according to Dr. *Willis*, or (as more probable to me) if it were not pure *Serum* (the Blood being diſſolved into its conſtituent Parts) breaking forth of the little Mouths of the *Cæliac*, and other *Arteries*.

Obſervation on a Woman who died of a Dropſy, *after the* Paracenteſis; *by Dr.* Ch. Preſton. *n.* 223. *p.* 330.

LI. In the Diſſection of Madam *Vaillant* by M. *Du Linier*, the *Liver* was found very white without, but red enough within; the *Epiploon* extreamly dried; the *Stomach* much bigger than ordinary; the Winding of the

Colon, which paſſes under the *Stomach*, extreamly drawn together by 3 Threads. In the *Umbilical* Region, the Inteſtines, *Jejunum* and *Ileon*, much inflamed, and their Tunicks much more thick than ordinary. In the *Hypogaſtrick* Region, all the inferior Part of the Inteſtine *Ileon*, on that Side near the *Bladder*, and all the Bottom of the *Matrix*, as alſo the inferior Part of the *Rectum*, much inflamed and ulcerated; in the Bottom of the *Matrix* there was an Abſceſs, and the internal Orifice extreamly dilated, about the Largeneſs of a Crown; the Extremity of the inferior Part of the *Ureter* cartilaginous; the Extremity of the *Tubæ Fallopianæ* went ſo high as the ſecond *Vertebre* of the *Lumbar* Region; in the interior Part it was dilated 6 Lines, and near the Bottom of the *Matrix*, about 2 Inches, and was tied to all the inferior Part of the *Kidney*; that of the Left Side was dilated about 4 Lines in the upper Part, and 6 in the inferior. The right *Teſticle*, or *Ovarium*, which ordinarily does not exceed the Bigneſs of a Pidgeon's Egg, was here 3 Inches long, and 2 of Breadth; and in the inferior Part there was found an Egg hanging by its Ligament, out of the *Tuba Fallopiana*, about the Bigneſs of the Yolk of a common Hen's Egg; which, for Experiment, I cauſed to be boiled, and it hardened as an ordinary Egg. The Right *Kidney* went up as far as the laſt of the true Ribs, and deſcended below the *Umbilical* Region; the *Pelvis* was dilated about 3 Inches in Breadth, and 7 in Length. The greateſt Part of the Water had run out in the *Operation*.

The *Lungs* were of a livid Colour, as in all *Chronical* Diſeaſes; and on the Right Side were adherent to the Membrane *Pleura*; and on the Left Side was an Adherence of the inferior *Lobe* to the *Diaphragm*. In the *Pericard* was little or no *Serum*, and what we found, of a bloody Colour. In diſſecting the *Heart*, we found a great *Polypus* in the Right *Ventricle*, taking up almoſt all the Cavity, about 5 or 6 Lines in Thickneſs, and Half a Foot in Length.

From what has been ſaid, it appears impoſſible that this Patient could have recovered, though the *Operation* had been performed; only this is to be remarked, that where the *Dropſy* is of a long Continuance, and the Perſons much debilitated, and of Age, in that Caſe the *Operation* ought not to be performed, for generally the *Viſcera* are corrupted. But when you find it convenient to perform this *Operation*, extract the Water by degrees, and not all at once, elſe you endanger the Perſon; for ſcarce one eſcapes of a hundred that is done otherwiſe.

The Cauſe of the Dropſy.

The true Cauſe of the *Dropſy* I take to be from the mechanick Structure of the Parts, and the Diſpoſition of the Blood; which are firſt the Relaxation of the Fibres and Pores of the *Veſſels*, or the *Veſiculæ*, which are between the Arteries and the Veins; or, ſecondly, a Compreſſion of the *Veſſels*; for the *Lymphaticks* take their Origin from the Membranes which cover the *Muſcles*, *Viſcera*, and *Glands*; therefore, when the *Veſiculæ* are too much ſtraitned with *Seroſity*, their Fibres loſe their natural Force, and become uncapable to expel the too great Quantity of Water; but the *Veſiculæ* are enlarged from Day to Day, until their Fibres ſuffer ſo great an Extenſion even as to break; from hence is the Source of thoſe Waters. It happens alſo ſometimes, that the

Pores of the ſaid *Veſiculæ* are ſo widened, that the *Lymph* runs into the *Cavity* of the *Belly*, or the Interſtices of the *Muſcles*: The Cauſe, from the Diſpoſition of the Blood, is either when it is too thin, or too viſcid; too thin, that it paſſes eaſily through the Pores of the *Veſicles*; too viſcid, that it cannot paſs through the *Capillary Veſſels*, and, by Conſequence, compreſſes the adjacent Parts, ſo cauſes *Obſtructions*.

A Cure for the Dropſy; *by Sir* Theodore Mayerne, *n.* 211. *p.* 166.

LII. *Pontæus* (the famous *Mountebank*) ſays, that for the *Dropſy*, after all other Things, one of the beſt Remedies in the World, is to take *Morſus Diaboli*, and put it over the Fire in a dry Kettle, that it may wet it only with its own Juice, and of this to apply a Quantity to the Belly and Reins of the Patient, covering him up warm, and ſo provoke Sweat; which will come away in great Quantity, and may be maintained according to the Strength of the Patient, and Exigency of the Caſe.

A large diſeaſed Kidney; *by Mr.* Will. Cowper. *n.* 122. *p.* 301.

LIII. A young Gentlewoman, not married, about 8 Years before her Death, found ſome ſmall Pains in the *Lumbal* Regions, and ſometimes made blackiſh Urine. If ſhe at any time uſed any Motion, the Pain would increaſe; commonly finding moſt Eaſe when her Body was ſedate. In this Indiſpoſition her Phyſicians in the Country preſcribed aſtringent Medicines. About 2 Years after, the *Lumbal* Pain increaſed on the left-ſide; and a great Weakneſs, Loſs of Appetite, and ill Digeſtion followed; of theſe Indiſpoſitions ſhe recovered again, and was, in all Appearance, healthful, and ſo continued near two Years and a Half; about which Time they returned again, together with black Urine, and frequent Incitations to vomit; but of theſe Diſorders ſhe had ſome Intermiſſions, and ſo ſhe continued about 2 Years. About *Chriſtmas* 1695, ſhe began to be afflicted with violent Pains, and her Urine appeared very black: Of theſe extravagant Pains ſhe was much eaſed with the Uſe of common Clyſters, but nevertheleſs continued much debilitated. The Beginning of *May* the Pains increaſed about the Regions of the *Loins* and *Pubes*, and ſhe was once or twice ſurprized with the falling down of a Weight within her (as ſhe expreſſed it.) When thus tormented, ſhe took large Doſes of *Opium*, which did ſomewhat alleviate the Extravagancy of Pain. The ordinary Poſition of the Trunk of her Body was more inclining to be erect than bending forwards, contrary to what we find in thoſe troubled with the *Stone* in their *Kidneys* or *Ureters*, except thoſe in whom the *Kidneys* are intumified. She complained of a *Stupor* or Numbneſs in the left Region of the *Loins*, whilſt very acute Pains affected the *Viſcera* of the lower Belly, eſpecially thoſe placed in the *Hypochondria*. The Pains on her *Pubes* increaſed near the Time of her Death, and a great *Stupor* affected the left Thigh, which ſhe was ſcarce able to draw after her, much leſs to put forwards in walking.

The Day after her Death I was called to diſſect her Body, which was very much emaciated. A large *Tumor* appeared in the left *Ilia*, extending it ſelf to the left Part of the *Epigaſtrium*, even to the *Hypochondrium* of that Side. The *Omentum* appeared very thin and membranous, cleaving to the left *Kid-*

ney; which was very much intumified, and cauſed that Appearance of a large *Tumour* before Diſſection. This *Kidney* had taken place of the *Spleen*, and touched the Bottom of the *Stomach*, and in ſuch Manner preſſed one Part of the *Colon*, as very much leſſened the Diameter of that Gut. The *Stomach* and *ſmall Guts* were ſomewhat diſtended with Wind; the former appeared very looſe, as if its proper Tone was much relaxed. The *Pancreas* appeared a little indurated. The left *Spermatick Vein* was very much extended, between the *Kidney* and the *Ovarium*; the upper Part of that *Vein* being compreſſed by the Superincumbency of the lower Part of that *Kidney*; inſomuch that the Trunk of this *Spermatick Vein* was very much leſſened, immediately before it enters into the left *Emulgent Vein*. In freeing this diſeaſed *Kidney* from its many Adheſions to the neighbouring Parts, its outward Membrane happened to burſt in two or three Places, whence iſſued a large Quantity of grumous Blood. This *Kidney* weighed 5 Pounds, and the other but 5 Ounces, which was of a common Size, and no ways diſordered. By the Diſtenſion of the membranous Parts of the *Kidney* itſelf, its Veins were, in a great Meaſure, compreſſed. Its *Ureter F F*, was large through the Intumeſcence, or thickening of its Sides, whereby its Cavity was ſtreightened. In a Diviſion made by cutting into the Body of this ſwelled *Kidney*, its Inſide appeared like that of a *ſchirrons* or boiled *Liver*. I found 2 or 3 large Cells *B*, filled with grumous Blood, which proceeded from an Eruption of ſome Blood-Veſſels before Death, which I am apt to think might alarum the Patient with the Apprehenſions of ſome Weight falling down (as ſhe expreſſed it.) In the *Vagina Uteri*, near the *Meatus Urinarius*, was an ulcerous Appearance, attended with a Mortification. The left *Pſoas* Muſcle was very much leſſened by the Compreſſion of the lower Part of that *Kidney*; and the Nerves, diſtributed to ſome Parts of the Thigh, which paſs through that Muſcle, were expoſed to View.

A Polypus *in the* Heart.

Nothing diſordered appeared in the *Thorax*, but what is commonly obſerved after Death in all *Chronical* Diſeaſes, *viz.* a *Polypus* in each *Ventricle* of the *Heart*, and great Blood-Veſſels; of which I have commonly obſerved the right *Ventricle*, and the Veins, to be furniſh'd with the largeſt *Polypus's*, eſpecially the *Vena Cava* and right *Auricle*; the latter of which I very lately found compleatly diſtended with a *Polypus*, or Coagulation of *Serum*, in the Body of a Boy who died with a *Hydrops Thoracis*; in which Caſe, the Symptoms of Sighing and Difficulty of Inſpiration I have always found remarkable. I cannot but think the ſlow Return of the Blood by the Veins, is the immediate Cauſe of the Coagulation of the ſerous Part of the Blood, which frames theſe Bodies, which from the Figure (which they acquire from the Parts they are lodged in) are called *Polypi*. Hence it is the *Syſtole* of the *Heart* prevents their being framed ſo large in the left *Ventricle* and Arteries, as in the Right and the Veins; the Blood being carried through the former with much greater Force than the latter.

Blackiſh Urine, I believe, is commonly obſerved in many *feveriſh* Indiſpoſitions; where the Blood is either partially obſtructed in its Return by the Veins of the *Kidneys*, or through its great Velocity in paſſing the *Kidneys*;

when ſome Part of the Globules of the Blood alſo paſs out at the *urinary Pores* in the Sides of the Blood-Veſſels, and thoſe Globules being broken, exhibit thoſe blackiſh Bodies, which appear in the Sediment of the Urine. In theſe Caſes, the *Serum* of the Blood paſſes off with the Urine; for by evaporating ſuch Urine by Heat, as in a Spoon over a Candle, it will lacteſce, and become thick, like the true *Serum* of the Blood.

Obſtructions commonly begin in the moſt *capillary Veſſels* firſt; as I have frequently obſerved in viewing the tranſparent Fins of divers living Fishes with my *Microſcope:* And though it has been hitherto commonly ſuppoſed, that Veins and Arteries are all equally leſſened at their Extremities, yet I am of Opinion (and I believe can give ocular Demonſtration of it too) that the Extremities of divers Blood-Veſſels are much larger than their Companions. Hence an Account may be given of the partial Circulation of the Blood, and yet Mortifications not neceſſarily ſucceed, as in the preſent Caſe: For the *Kidney* here being vaſtly extended, which proceeded from a Retardation of the refluent Blood and *Lympha*, it is conceivable that the Obſtructions began in the Membranes which compoſe the Parities of the Trunks of the Veins and *Lymphe-Ducts*, whence an Intumeſcence neceſſarily follows, and the Cavities of thoſe Veſſels are leſſened; conſequently the refluent Blood or *Lympha* not being duly diſcharged, thoſe larger Veſſels are neceſſarily diſtended between their intumefied Sides with compreſſed Cavities, and their Extremities at the Arteries. Thus we may apprehend how a Part remains intumefied, under a partial Circulation, and may (when no ill Juices are joined with the Blood and *Lympha*) continue ſo for ſome Months, nay Years, as in the preſent Caſe, without any Diſorder to the Patient, but on ſuch Motions of the Body, as accelerate the Motions of the Blood at the Extremities of the Veſſels, when there is a greater Quantity of Blood imported than can be diſcharged by the Veins; whence a ſudden Intumeſcence ariſes, and Pains neceſſarily follow. What aſtringent Medicines avail, in ſuch like Caſes, is difficult to conceive, but Aperitives might be ſerviceable. Loſs of Appetite, ill Digeſtion, *&c.* attend *Nephritical* Caſes, by the nervous Communications of thoſe of the *Kidney* with the *Stomach*, *&c.* whence the *Tone* of that *Part*, as well as the *Inteſtines*, eſpecially the *Colon*, becomes vitiated, and ſubject to frequent Diſorders, eſpecially Vomiting and *Cholick* Pains. By *Tone* of that *Part*, I mean, that proper Diſtribution of the *nervous* Ramifications within the Part when extended, as in this Caſe, and *inteſtinal* Ruptures (as they are called) and the like; or when the *nervous* Ramifications are relaxed, as in *paralytical* Caſes, *&c.* the *Tone* of the *Part* neceſſarily becomes vitiated, in as much as its *nervous* Diſtributions are diſordered. The Contents of the *Stomach* and *Guts* not being duly carried on, are apt to ferment; the contained Air being rarified by the natural Heat, the *Inteſtines* or *Stomach* (not being able to reſiſt the Enlargement of that rarified Air) gives way, and becomes very much diſtended; whence *Cholick* Pains, and Diſturbances in thoſe Parts ſometimes ariſe, as I am apt to think in theſe Caſes. Hence, by procuring the Evacuation of this contained Wind, the Afflicted are eaſed, as by giving of *Clyſters*,

ſters, &c. To diſcover the Operation of *Opium*, and how it procures Eaſe in this and ſuch like Caſes, I examined a Solution of *Opium* with my *Microſcope*; the Particles of the diſſolved *Opium* appeared like fringed Globules. Theſe Particles we were inclined to think (if ſo conveyed to the Maſs of Blood) might ſo entangle in its *Serum*, and thicken it, as to occaſion a Retardation of the Globules of the Blood, and hinder their progreſſive Motion at the Extremities of the Blood-Veſſels: Hence the Blood not paſſing with its wonted Velocity, does not ſo ſuddenly extend thoſe enlarged Veſſels, which have a conſiderable Share in the Intumeſcence of the Part; but by making the Globules of the Blood paſs more calmly, might prevent their ſudden Efforts or Intruſions into thoſe diſtended Veſſels.

The intumefied *Kidney* not only compreſſed the Left *Spermatick* Vein, whereby the refluent Blood of the *Uterus*, *Vagina*, and Parts adjacent, was in ſome meaſure retarded, but ſome of the Nerves of the *Vagina*, and thoſe of the *Pudendum*, were alſo compreſſed thereby; hence Pain ariſing from Inflammation, through a Retardation of the Blood at the Extremities of the vaſt Number of Blood-Veſſels about the *Meatus Urinarius*, at its Egreſs in the *Vagina*; whence Exulceration and Mortification followed. The Magnitude of this *Kidney* prevented the bending forwards of the Trunk of the Body; whence it was, ſhe was obliged to keep it erect. The lower Part of the Left *Kidney* had ſo preſt on the Left *Muſculus Pſoas*, as ſcarce a 3d Part of its proper Bulk remained: Whence neceſſarily followed a great Indebilitation in the drawing the Thigh forwards. She had a great *Stupor* in that Thigh, through a Compreſſion of the *Lumbal* Nerves, which lay expoſed immediately under the intumefied *Kidney*.

I am apt to think, that Caſes like this are often taken to proceed from Stones in the *Kidneys* or *Ureters*; but I conceive, that unuſual Poſture of keeping the Body erect, may diſtinguiſh it, together with an Indebilitation of drawing the Thigh and Leg forwards. If theſe Symptoms do not conjunctly occur, yet by this we may be admoniſhed, that *nephritical* Diſorders are not, as is commonly thought, owing to *Stones*, whether in the *Kidneys* or *Ureters*.

Explanation of the Figure.
Fig. 31.

A, The upper Part of the *Kidney*, which touched the Bottom of the *Stomach* and *Spleen*. *B*, The lower Part, conſiſting of divers Protuberances; the Inſides of which were diſtended with extravaſated Blood. *CC*, The *Blood-Veſſels* of the proper Membrane of the *Kidney* diſtended. *D*, The *Fat* placed at the Entrance of the *Veſſels* into the *Kidney*. *EE*, The *emulgent* Arteries and Veins cut off. *FF*, The *Ureter* very much thickened in its Sides, and cleaving to the lower Part of the *Kidney*.

Four Ureters *in an Infant*; *by Dr.* Edw. Tyſon.
*n.*142.*p.*1039.
Fig. 32, 33.

LIV. *May* 23, 1697, Upon opening an Infant, I found the *Ureters* double to both *Kidneys*; their Origination from the *Kidneys* being at ſome diſtance from each other, but afterwards both of the ſame Side, were incloſed in a *Capſula*, or Membrane, even to the *Bladder*, where thoſe of the Right Side were inſerted ſeverally, yet near each other; but on the Left they ſeemed to enter at the ſame Orifice.

The Glandulæ Renales. *Fig.* 34.

I have given a *Cut* of the Right *Kidney*, and of both the *Glandulæ Renales*, as well to ſhew their juſt Magnitude and Figure (as they appeared in this Body) as alſo their Proportion to each other. As far as I have hitherto obſerved, the *Glandulæ Renales* in *Embryo's* and Infants are greater, at leaſt proportionably, than in *Adults*. They have a large Cavity, which, by blowing into them, I found emptied themſelves into two Veins; whereof the Right immediately paſſed into the *Vena Cava*, the Left into the *Emulgent*. Beſides theſe, they had other leſſer ones from the neighbouring Veſſels.

Explication of the Figures.

Fig. 32. *A*, The Right *Kidney*, whoſe Superfice ſeemed to be variouſly divided. *B*, The *Emulgent Vein*. *C*, The *Emulgent Artery*. *d d*, Two *Ureters* belonging to this *Kidney*.

Fig. 33. Repreſents the two *Ureters* of the Left *Kidney*, which a little below the *Kidney* are both encloſed in a common *Capſula*, or Caſe, and ſo continued to the *Bladder*.

Fig. 34. The *Glandula Renalis* of the Right Side. *B*, That of the Left. *C*, The *Vena Cava*. *d*, A Vein, or *Ductus*, opening from the Cavity of this Gland, and entring the *Vena Cava*. *e*, A Vein from the Left *Glandula Renalis*, and is inſerted into a Branch of the Left *Emulgent*.

A Paſſage of Urine *to the* Bladder, *diſtinct from the* Ureters; *by* M——— *n*.65. *p*. 2084. *n*.67. *p*. 2049.

LV. I made a Dog drink a good Quantity of Water, and thereupon cauſed his *Ureters* to be well tied about, and emptied his *Bladder*. After two Hours I found the *Bladder* empty, and the *Ureters* were not tumid above the Ligature. Being ſurprized thereat, I believed that the Cauſe might be the too much cooling of the inward Parts, that had all this while been expoſed to the open Air. To avoid this Inconvenience, I cauſed a ſmall Opening to be made on each Side another Dog, ſufficient to find and to tie the *Ureters*, and to ſqueeze the *Urine* out of the *Bladder*, by preſſing it with one's Hand. This done, I made theſe Openings to be ſowed up again; and then having made the Dog drink good Store of Water, I left him for near three Hours in the leaſt violent Poſture that his Ligatures would permit. Afterwards having opened both the Holes, and the *Bladder* being preſſed with the Hand, there iſſued out of it a pretty Quantity of *Urine*, and the *Ureters* ſeemed to be a little ſwelled above the Ligature.

A Schirrous Bladder, *containing in its Bags a Serous Matter*; *by Dr*. Edward Tyſon. *n*. 188. *p*. 332.

LVI. On the Diſſection of Mr. *Smith* of *Highgate*, *July* 8, 1687, we diſcovered the *Bladder* very *ſchirrous*, and $\frac{1}{4}$ of an Inch thick, of a preternatural Figure, and diſtended to the Bigneſs of a Child's Head; and at the Entrance of the *Ureters* on each Side were two Protuberances, of the Bigneſs of a Hen's Egg each. The *Ureters* were of the Largeneſs of the ſmall Guts in Children, ſo that they could eaſily admit two Fingers into their Cavity. They were both replete with *Urine*, or a ſerous Matter; which, upon Preſſure, did eaſily regurgitate into the *Kidneys*, but would not paſs at all into the *Bladder*. The *Kidneys* were of their natural Bigneſs and Figure, but ſo emaciated, that they were rather large Bags, than of a fleſhy Subſtance: The

Cavity of the *Pelvis* being ſo large, as to contain above three Ounces of Water. In the *Bladder* we found a very ſtrange ſort of *Cyſtes*, or Bags, of the exact Figure of Eggs, of ſeveral Dimenſions, ſome larger than Gooſe-Eggs, others as big as Hen-Eggs, to the Number of twelve in all; and about eight of them whole, and replete with a *limpid Serum*. The Coats of theſe *Bladders* were ſome of them conſiderably thick, others very thin and tender; all of them looſe and free, without the leaſt Adheſion either to one another, or to the Coat of the *Bladder*. There was little or no *Urine* in the *Bladder*, but what was contained in theſe *Bags:* Nor could we imagine that this miſerable Patient could poſſibly make any Water, but what happened upon the Breach of ſome of theſe watry Tumours, when the *Bladder* was crowded beyond its Dimenſions; for that the Paſſage by the *Ureters* into the *Bladder* was impervious.

The Liquor contained in theſe Bags, we did conjecture to be of the nutritious Juice of the Body; and upon Trial of boiling a ſmall Quanting of it, we found it to thicken, and come to the Conſiſtence of a ſtiff and glutinous Jelly. Theſe *Veſiculæ* were undoubtedly formed from the Tenacity of the Matter between the Membranes of the *Bladder*, in its oblique Paſſage through them; for that, being ſo glutinous, it was here detained till its Superficies was condenſed into a firm Coat, and ſo, by the coming of more Matter, was forced into the Cavity of the *Bladder*. This I ſuppoſe, from our finding two of theſe *Ova* in a diſtinct *Sinus* from the reſt, between the Coats of the *Bladder* at the Entrance of each *Ureter*.

The *Liver* we found very large and hard, of the Colour and Subſtance of a boiled one. It adhered to the *Peritonæum* on the external Part, and, by its vaſt Bigneſs, had ſo ſtrained the *Thorax*, that there was very little Room for the *Lungs*. The *Lungs* we found of a livid Colour, adhering cloſe to the *Pleura* on the Right-Side; upon Inciſion we found them wholly replete with a purulent Matter, and a *Stone*, of the Bigneſs of a Cherry-ſtone in one *Lobe*. Dividing the *Pericardium*, we found a fungous Subſtance covering the *Heart* all over, and Fibres from it that ran to the *Pericardium* in a great Number, ſo that they were by theſe Fibres every where united. The *Heart* was very large, the Right *Auricle* and *Ventricle* were one large undivided Cavity, and therein a large *Polypus*, which ran up the *deſcending* Branch of the *Vena Cava* to the very *Jugular*, another Part being diſtributed to the *Pulmonary Artery*. In the Left *Ventricle* was another *Polypus*, not ſo large as the former; it had two Branches, one in the *Pulmonary Vein*, another in the *Arteria Magna*, or *Aorta*. One of the *Veſiculæ* being opened, had a large Cluſter of ſmall *Ova*, as big as Grapes, all replete with Liquor; all the reſt contained nothing but *Serum*.

Suppreſſions of Urine (*not cauſed by a* Stone) *cured with* Acids; *by Dr.* Edw. Baynard. *n.* 215. *p.* 20.

LVII. A Servant of Mr. *Baniſter*'s had laboured 7 or 8 Days under a total *Suppreſſion* of *Urine*. Mr. *Ch. Bernard* tried his *Catheter*, but found not the leaſt Appearance of any *Stone* there, nor a Drop of Water in his *Bladder*. Whereupon Dr. *Baynard*, ſuppoſing it might be the ſame Caſe of which that moſt learned Prelate Dr. *Wilkins*, late Biſhop of *Cheſter*, died, cauſed the Patient to take a Quantity of *Acids* in a convenient Vehicle; upon which, Secretion being preſently made, he immediately *urined* in great Quantity, and was thereby reſtored to his Health.

A *Member* of *Parliament*, being found in the like Condition, was, by the Uſe of *Acids*, reſtored to his Health. And in ſeveral Caſes ſince, he has found it to anſwer with great Succeſs.

In another like *Suppreſſion* of *Urine*, and after many Medicines given in vain, Mr. *Baniſter* propoſed Dr. *Baynard*'s Method, which cauſed the Patient to *urine* preſently.

A Stone *taken from a Woman; by Dr.* Beal. *n.* 18. *p.* 320.

LVIII. A Stone was taken out of the Womb of a Woman, near *Trent* in *Somerſetſhire*, by Inciſion, in *Eaſter* 1666. I have ſeen the Stone, and weighed it in Gold Scales, where it wanted ſomewhat of 4 Ounces; but it had loſt of the Weight it formerly had, being now very light for a Stone of that Bulk. It is of a whitiſh Colour, lighter than Aſh-colour: It had no deep Aſperities; and had ſomewhat of an oval Figure, but leſs at one End than a Hen-Egg, and bigger and blunter at the other End than a Gooſe-Egg.

Many Stones *taken from one* Bladder; *by Dr.* Nath. Fairfax *n.* 26. *p.* 482.

LIX. 1. Mr. *Goodrick* (a Chirurgeon of *Bury St. Edmund*'s) affirmed to me, himſelf cutting a Lad of the *Stone*, took out thence, at one Time, 96 ſmall *Stones*, all of them of unlike Shape, Size, Corners, Sides; ſome of which were ſo beſtowed, as to ſlide upon others, and had thereby worn their Flats to a wonderful Slickneſs. He aſſured me alſo, that in the ſame Place, another, when dead, had a *Stone* taken from him, almoſt as big as a new-born Child's Head, and much of that Shape.

By M. Caſparus Wendland. *n.* 99. *p.* 6156.

2. Mr. *Jo. Braun*, of *Dantzick*, a Gentleman of 71 Years of Age, being dead, I opened his Body, to find the Cauſe of the exceſſive Pains he had endured for two Years and a Half in his *Penis*, with a continual cutting, burning, and preſſing of his *Urine*, coming from him Dropwiſe, until at laſt it came to a conſtant Endeavour of going to Stool, and of making Water; which, a few Weeks before his Death, ended in a continual Running of *Urine*, with very ſharp Pain; after which, about 4 Days before his Death, to my Knowledge, the Water was totally ſtopped. We found the *Bladder* quite full of *Stones*, of which the biggeſt was of the Bigneſs of a Pidgeon's Egg, and ſomewhat larger. Of the bigger Sort there were 16, yet differing in Size; the reſt were very ſmall, to the Number of 22. We found not a Drop of *Urine* in the *Bladder*; but it had already made, on the Side of the Orifice of the *Bladder*, an Opening of a conſiderable Bigneſs; upon which, Death neceſſarily enſued. In the *Kidneys* and *Ureters* there could not be found the leaſt Grain or Mark of *Sand*.

By Mr. Chr. Kirkby. *Ib.* *p.* 6155.

3. Several of the leſſer Sort of theſe *Stones* were triangular and quadrangular; their Flats worn to a great Smoothneſs, and their Corners blunted. The greateſt *Stone* weighed 206 *Gr.* the leaſt 3 *Gr.* all the 38 weighed $4\frac{7}{8}$ *Ounces*. The Matter of the *Stones* is exceeding compact, and like white

Clay; and though the ſeveral Coats may be diſcerned in one of them which I broke, yet they are not eaſily ſeparable.

LX. A Woman near *Dantzick*, of 56 Years of Age, unmarried, whoſe whole Courſe of Life had been extreamly ſedentary, was troubled, ſome Years before her Death, with great Pains in her Back, eſpecially towards her Right Side, and a continual Inclination to, and effective Vomiting; whoſe *Urine*, for ſome time before, was turbid, and, as it were, mingled with Blood; yet totally void of ſalſuginous Matter. Her Phyſicians adjudged that Symptom of bloody Water to have proceeded, *ex præmatura Ceſſatione Menſium* (which left her in the 40th Year of her Age;) thereby perhaps deceived, becauſe there was never either *Stone* or *Gravel* voided by her. But her laſt Doctor (from whom I have this Relation) adjudged it to proceed *ab affectu* Nephritico *& quidem graviſſimo*. When ſhe was opened, he found the Left *Kidney* filled with large *Stones*, but the Right wholly petrified, covered with the ordinary Skin, without any Fleſh: It was both maſſy and ponderous, ſo concreted by the cloſe Coalition of minute *Sand*, which might be rubbed off by your Finger.

Stones *in the* Kidneys; *by M.*Chr. Kirkby. *n.* 71. *p.* 2158.

LXI. A poor Woman, near *Aberdeen*, who hath been of a Time ſadly afflicted with the *Gravel*, hath lately paſſed 4 *Stones* of an unuſual Bigneſs; of which I have one by me, which, though it be not the greateſt of the 4, is yet more than 5 Inches about the one Way, and 4 the other: They are all oval; the firſt, and Part of the ſecond, were ſmooth; but the other two very *rough*; and the laſt, the biggeſt, which being come away about *Chriſtmas* 1676, was bloody on one Side when I ſaw it.

Large Stones *voided by a Woman; by Dr.* George Garden. *n.* 134. *p.* 843.

A *Stone* was alſo found, the ſame Year, in a Gentleman's *Bladder* in this Country, after his Deceaſe, weighing 32 *Ounces*.

A Stone *of* 32 *Ounces*.

LXII. 1. I here give you the *Figure* of a *Stone*, ſomewhat reſembling the *Kidney*; for that was quite worn away, and this *Stone* filled up the Place: It weighed, when I took it out of the Body, 7 $\frac{1}{2}$ *Ounces*; but not ſo much now. I meaſured 7 Inches upon the Round. I find it conſiſts of ſeveral *Laminæ* laid over one another, as that of the *Bladder* does.

2. I had Leave of Sir *Theodore de Vaux* to take the *Figure* of that *Stone* which was taken out of the Body of the late Duke of *Norfolk*'s Father. It ſeems to have ſpread ſome of its Branches into the great Veſſels. It weighs 4$\frac{1}{2}$ *Ounces*; and meaſures longwiſe, from one Extream to the other, 4 Inches compleat; and the Extenſion of the Branches, from one to the other, meaſured croſſwiſe or tranſverſly, 3 $\frac{1}{2}$ Inches.

Two large and oddly ſhaped Stones *in the* Kidneys; *by Dr.* Fred. Slare. *n.* 157. *p.* 534. *Fig.* 35.

Fig. 36.

LXIII. This *Stone* was taken out of the Bladder of one *Fr. Dugood*, of *Auchenhove* in *Aberdeen*. The Man who bred it, lived till he was 50 Years old. The Length of it is 5 $\frac{9}{10}$ Inches, the Diameter, 3 $\frac{6}{10}$; the Weight, 2 Pound 3 Ounces and 6 Drams.

A very great Stone *of the* Bladder; *by* ——— *n.* 171. *p.* 1015.

LXIV.

Stones *voided* per Penem; *by Dr.* Cole. *n.* 175. *p.* 1162. *Fig.* 37, 38.

LXIV. Two *Stones*, of the Shape and Bigneſs of the *Figures*, were voided by the *Penis*, without any conſiderable Pain, by a Perſon about *Worceſter* 1684. The Perſon that voided them told me, he was for many Years ſubject to great Pain, firſt in the *Kidneys*, and afterwards in the *Bladder*, when that in the *Kidneys* ceaſed: But after their Excluſion he was free from Pain.

A large Stone *voided by a Woman; by* ——— *n.* 178. *p.* 1271.

LXV. A Stone came from the Bladder of a Gentlewoman of *Wallingford*, at the Age of 63 Years. The Compaſs of it was $5\frac{1}{2}$ Inches, the Length $4\frac{3}{4}$ Inches; the Weight 3 Ounces *Avoirdupois*. This Stone was, at its coming off, taken out by her Huſband, without the Help or Inſtrument of Phyſician or Chirurgeon, and without Effuſion of Blood; ſince its coming off, ſhe has been troubled with *Urinæ Incontinentia.*

A large Stone *voided by a Woman; by Dr.* Tho. Molineux. *n.* 202. *p.* 818. *Fig.* 39.

LXVI. Mrs. *Margaret Plunket* of *Dublin*, *May* 29, 1691, voided through her *urinary Paſſage*, by the Help of Nature alone, without the Uſe of Remedies, or any forcible Means whatever, a *Stone* ſomewhat reſembling a hard Pear a little preſt or flatted. Its Circumference meaſured, the longeſt way, $7\frac{3}{10}$ Inches; round about, where it was largeſt, $5\frac{3}{5}$ Inches; its Weight at preſent, according to *Troy* Pound ℥ij, ʒij, ℈j, *gr.* 6. It has loſt conſiderably both of its firſt Bulk and Weight, by many little Fragments breaking off from the ſmaller End *A*, where it is much ſofter, ſmoother, whiter, its Parts more porous, and ſo incoherent, that the leaſt Force ſevers them: Whereas the bigger End *B*, as far as the Stroak *c c c*, is of very different Texture, much more cloſe and compact, covered with a yellowiſh ſhining Cruſt, rough, granulated, and as hard as the beſt *Portland* Stone. For theſe 3 Months paſt, whilſt it was ſticking in the *urinary Paſſage*, and coming away, ſhe has ſuffered great Pains, and a perpetual *Strangury*, or an involuntary dropping of her Water from her; and this Infirmity ſtill continues, by reaſon the Largeneſs of the *Stone* has over-ſtretched the Fibres that compoſe the *Sphincter* of the *Bladder* in its Paſſage through it; whence their Tone is ſo relaxed, that they have loſt all Power of Retention; and for this Reaſon, I find all Women that void *Stones* this Way, of any conſiderable Bigneſs, are conſtantly attended with this Weakneſs. But ſince the *Stone* came away, her Pains are ſo abated, that ſhe can walk about.

An extraordinary Stone *in the* Kidney; *by Dr.* Rob. Witty. *n.* 207. *p.* 30.

LXVII. A Gentlewoman of 31 Years of Age, had been long troubled with a Loathing in her Stomach, and Indigeſtion, ſo that ſhe had little or no Appetite, and almoſt every Thing ſhe ſwallowed ſhe vomited immediately. She had likewiſe a plentiful Diſcharge of green Bile by Stool. Being called to her, I ordered her a great many Medicines proper to recover the Tone of the Stomach and Bowels, whereby ſhe found herſelf better for ſome Time, and went abroad every Day for ſome Months. But the Snake lay only concealed for a while; ſhe relapſed into the ſame Symptoms, and the fatal Diſeaſe was altogether incurable, thoſe Symptoms being owing, as I then obſerved, to a Stone lodged in the left *Kidney*. In the Month of *July*, as ſhe was very deſirous to drink the *Epſom* Waters, and at the ſame

Time had a ſpurious Tertian upon her, I adviſed her to paſs ſome Weeks there for the Benefit of the Air and the Company, but to drink ſparingly of the Waters, for fear of irritating the Nephritick Symptoms. Returning after two Months, ſhe found herſelf worſe in every Reſpect, could receive no Benefit neither from Cordials nor Aliments, nor could ſhe lie upon either Side for the Pain. At laſt, that beſt of Women, cruſhed with innumerable violent Symptoms, died very eaſily, *January* 28, 16$\frac{72}{73}$.

We opened her Body the Day following, and found the *Lungs* of a bad Colour, and the right Lobe ſeemingly inclined to putrify; ſo that had ſhe lived longer, ſhe would have been in Danger of a Conſumption of that Viſcus. The *Stomach* appeared next very much diſtended, like a Bladder filled with Air, ſo that its Fibres being thereby weakned and ſtretched beyond their natural Tone, no Wonder if the Aliments were either immediately thrown up again, or ſent down into the Inteſtines without being digeſted. We next examined the *Heart*, which was very ſmall, thin and limber, like an empty Purſe; for its *Parenchyma*, by the continued Heat of the above mentioned Fever, and the conſequent Hectick, was melted as it were in its own Liquor, and had contracted a Softneſs. And hence it was, that ſhe had always an undulating Pulſe, ſo that at laſt, towards the End of the Diſeaſe, you could ſcarce feel that ſhe had any Pulſe at all. The *Liver* indeed was ſound, but immoderately large, and not only filled the right Side, but likewiſe the left, ſo that the *Spleen* was thereby impoveriſhed, and very ſmall and ſlender. It adhered likewiſe ſo firmly on both Sides, but eſpecially the right, to the neighbouring Parts, that it required a good deal of Force in the Surgeon to ſeparate it. And upon this Account it was, that for ſome Months ſhe could ſleep upon neither Side; nay, ſhe could not lean to one Side without Pain: For in this Poſture the *Liver* preſſing heavier upon the *Peritonæum*, which is a Membrane of exquiſite Senſe, occaſioned a painful Diſtention of it, and the Stomach being too much compreſſed, was forced to throw up its Contents. In the concave Part of each *Liver* (if I may be allowed ſo to ſpeak, ſeeing there could only be one filling up both Sides) lay concealed a *Gall-Bladder*, ſo that there were plainly two of them, ſeparated from one another the Length of my Hand at leaſt, and turgid with Bile; but that on the left Side was ſmaller and blacker than the other.

We came at laſt to examine the *Kidneys*, the Right of which we found every Way in a natural State, nor had ſhe any Complaint on that Side, as far as I know. But from the Left *Kidney* where I had always ſaid the Cauſe of the Diſeaſe lay, and which killed her at laſt, we took out a Stone, not very large indeed, nor heavy (for it did not exceed Half an Ounce) but ſurpriſingly tortuous, much like Chalk, and divaricated like a Kind of Root into three Slips tied together in the Middle, the Breadth of three Inches. 'Tis inexpreſſible what Pain that good Woman ſuffered from the Figure of this Stone, which compreſſed the *Kidney* with its three Points in ſuch a Manner, as to diſtort the *Parenchyma* into its own Figure.

Two Stones *lodged* 20 *Years in the* Meatus Urinarius; *by Mr.* Charles Bernard. *n.* 220. *p.* 250.

LXVIII. In *Sept.* 1695, I was carried to one Mr. *Blondel*, who was lately recovered from a feveriſh Indiſpoſition. He complained of a very hard Swelling a little behind the *Scrotum*, which had remained there many Years, and created great Uneaſineſs to him. Upon examining it with my Fingers, I immediately declared it to be a *Stone* of a very odd and irregular Figure. He had about 20 Years before, while a Lad, been cut by Mr. *Hollier* for the *Stone* of the *Bladder*; and he had not long recovered from under Mr. *Hollier*'s Care, before he began to complain of Pain, which reſembled his old Pain of the *Stone*; and this continued upon him for 4 or 5 Years, before he was ſenſible of any Fullneſs or Swelling *in Perinæo*, which you are to ſuppoſe at firſt but ſmall. I am inclined to believe that Mr. *Hollier* left either a couple of little *Stones*, or Pieces of *Stone*, at the Time of Extraction, which were by Degrees protruded into the *Urethra*; but being too big to be voided, there lodged themſelves, and ſo, by perpetual Accretion, arrived to that Magnitude which you ſee. He conſtantly complained of Pain in making Water, which ordinarily flowed *Guttatim*, and involuntarily, for ſeveral Years paſt. Nor was he longer at Eaſe, than while his *Bladder* was full and diſtended with Urine; which Diſtention was continued all along the Neck and the *Urethra*, as far as where the *Stones* were bedded; for his only Way of procuring Eaſe to himſelf, was by frequent drinking very large Quantities of Small Beer or Water, and as ſoon as the Separation could be made of the Urine into the *Bladder*, and while that continued full, he was ſenſible of ſome Eaſe. He has been likewiſe exceeding liable to Vomiting of late, and generally moleſted with a *Diarrhœa* for ſome Years paſt; both which had lately ſo increaſed upon him, as very much to have impaired his Health, and weakened his Conſtitution.

After the Evacuations that are proper to precede ſuch an Operation, I cut upon the moſt protuberant Part of the *Stone* (which I then ſuppoſed to be but one) and making my Inciſion pretty large, the upper Part, which proved a diſtinct *Stone*, and had formed itſelf a Socket in the lowermoſt, ſlipped out with little or no Difficulty; the other, which was forked, and was as it were bound in, as if it had adhered to the *Urethra*, was removed with more Trouble, and broke in the taking out, they being neither of them very hard. To facilitate the Removal of this *Stone*, I put two of my Fingers up his Fundament, to ſecure it from retiring towards his *Bladder*, and to my great Surprize I found, that one of the Angles had perforated into the *Anus*. There was not an Ounce of Blood loſt in the Operation; the *Stones* having lodged long there, you muſt imagine had made a very great Diſtention of the *Urethra*, ſo that it was become ſo callous, that I ſeemed to cut through a Cartilage.

Fig. 40.

A, The Point which tended towards the *Glands*. *B*, That Part which lay in the *Acetabulum*. *C*, The Part upon which I made Inciſion. *D*, The *Acetabulum*. *E*, The Point which lay toward the *Neck* of the *Bladder*. *F*, That which had perforated into the *Anus*.

LXIX. In the Hoſpital at *Paris*, called *L'Hoſpital de la Charité*, there is preſerved a *Stone* of a prodigious Bigneſs, weighing about 51 Ounces. It was taken from one of the Religious Brothers in *June* 1690, but he died in the Operation.

A prodigious Stone *in the* Bladder; *by Dr.* Charles Preſton. *n.* 222. *p.* 310.

LXX. In *June* 1696, while I was at *Ghent*, M. *Parſaima*, Lithotomiſt, found a *Stone* adherent to the Bottom of the *Bladder*. When he made the Operation he could not extract the *Stone*, ſo that he was obliged to leave his Patient in that Caſe; there followed an Impoſthume, and 8 Days after, he extracted it with great Eaſe. The next Day he ſhewed me the *Stone*, to which the Fibres by which it was tied were yet adherent, and could eaſily be obſerved by the naked Eye, without the Help of a *Microſcope*, ſo that I could not queſtion any thing as to the Matter of Fact.

A Stone *cut from the* Bladder *which adhered to it*; *by Dr.* Charles Preſton. *Ib.*

LXXI. 1. In *May* 1698, a Boy, in the 13th Year of his Age, had the Misfortune to fall backwards with his Head upon a Stone, and lay ¼ of an Hour without Senſe. The next Day he vomited ſome Blood; felt a Pain and Weight in the hinder Part of his Head and Neck; and loſt Appetite. Above a Fortnight after, as he was coming out of the Country, he had a frequent Deſire to piſs, and lighted from the Horſe ſeveral times, but could make no *Urine*; he vomited in this Time; the Suppreſſion had continued more than 24 Hours when I came to viſit him. He had a great Pain in his Head, a Pain in his Back and Groins, and in the Region of the *Bladder*, which was ſwelled, and he could not ſuffer it to be touched. I cauſed ſome mild Diureticks to be given to him preſently, and anointed his Groins and the *Regio Pubis*, with the uſual Ointment, and cauſed a Clyſter to be injected; upon which, that Night he paſſed firſt ſome *Sand*, and then ſome *Urine* by Spoonfuls. I cauſed him afterwards to be put in an half Bath of appropriate Simples. He was the Days following let Blood and purged; and becauſe the Pain and Weight in his Head troubled him much, a large Veſicatory was applied to the *Nucha*, which diſcharged much Humour from it. While this was a doing, he paſſed very much *Sand* of a greyiſh and whitiſh Colour; and after the firſt Purge, began to paſs *Stones* by the Yard of a conſiderable Bigneſs, with Pain in the Back ſometime before they fell down, then in the Groins, or along the *Ureters*, and moſt in the Right Side, yet ſometimes in the Left alſo. He found the Yard much dilated while they paſſed it, and he had a ſmarting Pain then, and while the *Urine* flowed; the *Stones* came in with the firſt of the *Urine*: He got ſeveral Emulſions, which had good Effect. Some of the *Stones* were round, ſome oval, ſome triangular, ſome of a pyramidal Form, ſome cubical. The Colours were different, ſome whitiſh, ſome brown, ſome blueiſh, ſome black, or of a dark Colour; the Conſiſtence of a ſandy Stone: They are not made up of ſeveral Coats upon other (as many confirmed *Stones* are) but look like Bricks, and may eaſily be mouldered to Powder; ſome in Thickneſs the 12th, ſome the 10th, ſome more than the 6th Part of an Inch, and ſome half an

Several Stones *voided by a Boy in* Scotland; *by Sir* Rob. Sibbald. *n.* 242. *p.* 264.

Inch long; moſt of them approached to a triangular Form. He found a Weight in the *Bladder* when they fell down; and he told me, he was ſenſible they came down the *Ureters*. He leaped, and ran ſometimes to haſten their Deſcent. In a Fortnight's Time he hath paſſed above 60 of them by the Yard. Upon the 20th and 21ſt of *June*, he paſſed 3 by the *Fundament*; ſince which he paſſed none by the Yard. Two of them were triangular, pretty big; and one as big as a little Plum, but of the Shape of a Pear; of the ſame ſandy Conſiſtence as the former, and of a greyiſh Colour. His Parents told me, that for ſome Years, that they lived near to the Shore of the *Firth* of *Forth*, the Boy ran often after the Women that catched the Sand-Eels (*Ammodites*) and brought Home his Pockets full of them, which oftentimes he boiled without taking Pains (as he ought) to free them of the Sand that ſtuck to them: This, with the glutinous Juice of that Fiſh, and the Sand mixed with the Bread, and other Aliments he uſed, hath furniſhed abundant Matter for theſe *Stones*. It is like (ſince he never had any Symptom of this before the Fall he got of late) the Hurt in the Hinder-Part of the Head might have occaſioned ſome *Torpor* in the Nerves, ſo that the *Fibrillæ* in the *Kidneys* could not act ſo vigorouſly (as need was) in the Separation and Expulſion of the *Sand*; and thus it came to gather and form into *Stones*.

The Cheat detected; by Dr. Jo. Wallis. *n.* 266.

3. I had the Diſcovery of the *Cheat* of theſe *Stones* from Dr. *Pitcairn*, who was at the Pains to find it out. This roguiſh Boy, to be kept from School, had ſo much Cunning as to impoſe upon a fond Mother, and other People.

Broken Stones *voided; by Sir* Rob. Sibbald. *n.* 241. *p.* 267.

LXXII. A Divine, about 70 Years of Age, after he had theſe 10 Years ſuffered much from a confirmed *Stone* he had in his *Bladder*, in 1697, paſt a vaſt Number of *Slices* of ſeveral Figures, many of them cornered and pointed; much of the Thickneſs of a Shilling *Sterling*; white within, and ſmooth; but without of a dark Colour; with Pain, and ſometimes a *Suppreſſion of Urine*, for ſeveral Hours, preceded them: He maketh Uſe of the uſual Remedies. In the Intervals he hath tolerable good Health.

I am alſo told, by an expert Phyſician, of two Patients of his; the one yet alive, who, after paſſing an incredible Number of theſe *Slices*, is now in perfect Health, and free of that Diſeaſe. The other, who died long ago, after paſſing for a long Time ſuch *Slices*, became free of the Diſeaſe; and when his Body was opened at his Death, no *Stone* or *Slices* were found in his *Bladder*.

A Stone *cut out from under the Tongue; by Dr.* M. Liſter. *n.* 83. *p.* 4062.

LXXIII. 1. The Patient, from whom this *Stone* was cut, told me, That about 8 Years before it was taken from him, he ſuffered an exceeding Cold in a Winter Sea-Voyage, which laſted much longer than he expected; and that, not long after his Landing, he found a certain *Nodus* or hard Lump in the very Place whence this *Stone* was cut. From that Time, upon all freſh Cold-taking, he ſuffered much Pain, in that Part eſpecially, and yet, that Cold being once over, that Part was no more painful than the reſt of his

Mouth. In the 7th and 8th Years, it often cauſed ſudden Swellings in all the *Glandules* about the Mouth and Throat, upon the firſt Draught of Beer at Meals, which yet would in a ſhort time fall again: But at laſt it began its Work with a ſudden *Vertigo*; which vertiginous Diſpoſition continued more or leſs from Spring till *Auguſt*, in which Month, without any previous Cauſe, ſave riding, the Place where it was lodged ſuddenly ſwelled, and ran purulent Matter at the Aperture of the *Ductus Whartonianus*; but it ſuddenly ſtopped of its running (which he cannot attribute to any thing but Cold) and ſwelled with a great Inflammation, and very great danger of choaking, it being ſcarce credible, what Pain he ſuffered in endeavouring to ſwallow even Beer, or any liquid Thing. This Extremity laſted 5 Days, in all which Time the Party had ſo vaſt a Flux of Spittle running from him, that it was not poſſible for him to repoſe his Head to ſleep, without wetting all the Bed about him; inſomuch as that it was very much queſtioned by ſome friendly Viſitants, whether he had not of himſelf, or by Miſtake, made uſe of ſome mercurial Medicine. The firſt Day the *Saliva* ran thin and tranſparent, almoſt like Water without any Bubbles; the ſecond Day, it ran frothy, it taſted ſalt (which yet he is apt to think hot rather than really ſalt, becauſe that Day the Inflammation was at the height.) The 3d Day it roped exceedingly. On this Day a ſmall Pin-hole broke directly over the Place of the *Stone*, and ran with purulent Matter as formerly; the 4th Day the *Saliva* ran inſipid, ſenſibly cold in the Mouth (which again confirms me in that Opinion, that the former ſharp Taſte was the Effect of Heat, and not the immediate Quality of ſalt Humour) very little frothy; the 5th Day (which was the Day of the Inciſion) it ran as on the 4th, but left an extream Clammineſs on the Teeth, inſomuch that they often clave together as though they had been joined together with Glue.

Upon the Inciſion, which proved not wide enough, the Membranes or Bags, wherein the *Stone* lay, came away firſt. The *Stone* itſelf was ſo hard as to endure the *Forcipes* in drawing it forth. It was covered over with graſs green Matter, which ſoon dried, and left the *Stone* of a whitiſh Colour. It is but light in proportion to its Bulk, weighing about 7 Grains; and it is much of the Shape of our ordinary Horſe-beans. There are viſible Impreſſions upon it of ſome capillary and ſmall Veſſels it was bred amongſt. Laſtly, It is ſcabrous or rough, ſand-like, although the Subſtance is *Tophaceous*.

A Stone bred at the Root of the Tongue; *by M.* Bonavert. *n.* 247. *p.* 440.

2. *Tho. Wood* of *Wrotham*, was ſo troubled with a *Quinſey*, that he could hardly ſwallow any Liquid. I found the *Tumour* tend to Suppuration inwardly, about the Root of his Tongue on the Right Side; but without any Sign of Suppuration outwardly, though it appeared there almoſt as big as an Egg. I ordered him maturating Gargles; and the next Day he broke it with his Finger, and brought out of his Mouth near ¼ of a Pint of Matter, and with it at laſt a *Stone*. He had likewiſe a *Ranula*, and before he had broke the *Tumour*, and ſpit out the Corruption, he could hardly ſpeak. I believe this *Stone* to be of the ſame Nature as thoſe generated in the *Kidneys* and *Bladder*.

By——*Ib.*

3. The Weight of this *Stone* in Air is 7 *Gr.* in Water $3\frac{3}{8}$; and therefore its *ſpecifick* Weight, compared with Water, is as 1931 to 1000.

A Stone *in the* Glandulæ Pineales; *by Sir* Edmund King. *n.* 1 *p.* 228.

LXXIV. Mr. *Robert Bacon* of *Windſor*, above 75 Years old, ſanguine and chearful in his natural Temper, about 12 Years before his Death was obſerved by his Friends, at his return Home from walking, to bend double to his Right Side, inſomuch that he would be ready to fall, and has been brought home in Coaches and Sedans, yet was always temperate, and never obſerved to be diſordered with Drink in his Life. He would often ſay, That he feared Fatuity or Diſtraction, and would pray that God would keep him in his right Mind. In his latter Years, his Appetite to all ſorts of Food inclined to *Canine*, and his Thirſt very great; he often complained of Pain in his Bowels; he was always deſirous to have his Head rubbed many times in the Day; his Urine and Excrement came away always involuntary, at Bed, Board, *&c.* of which he did not ſeem at all to be ſenſible. Of late he would always hang down his Head in a prone ſleeping Poſture, and his Head was very hot; he did ſweat very much every Night, and wet his Linen extraordinarily; and, in the whole, his rational Faculties ſeemed to be quite loſt for a great while before he died; for he would uſually take up Tongs, Fire-ſhovel, Brooms (many times all together) to walk by, though he had a Staff of his own; he would alſo hale the Chairs about the Houſe and up the Stairs, and graſp at any Thing with his Hands; he would often tumble on the Ground, and ſeldom riſe without help; he did rather creep along by Walls and Chairs than go, though formerly he went very upright; of late it was 2 or 3 Folks work to ſupport him to his Bed; he would put 2 or 3 Hats at a time upon his Head, like an Antick; he would many times ſtrike thoſe that attended him. He died of a Fever, *Nov.* 4, 1686.

Upon Diſſection, we found the *Liver* indifferently well coloured and firm; the *Spleen* ſhrivelled; the *Omentum* whole, but ill coloured; the Right *Kidney* ſound, with a few ſmall *Stones*; the Left *Kidney* two Parts of three waſted, and ſome coarſe *Gravel*, but both *Kidneys* very fat; the *Bladder* of *Gall* filled with one *Stone* only, and that no bigger than a long Nutmeg; ſome little coarſe *Gravel* and ſmall *Stones* in the *Bladder* of *Urine*; the *Lungs* well enough, only, by the Stagnation of Blood, diſcoloured and filled in ſeveral Places wiih *ichorous* ſpumy Matter; the *Pericardium* very thin, and too tender, and too little Water in it; very little Blood in the *Ventricles* of the *Heart*; the *Auricles* of the *Heart* perfectly ſound and ſtrong, as of any ſound Man of 20 Years old; thoſe, and the Strength of the Muſcles of the *Heart*, I admired.

The *Dura Mater* was extreamly hard, thin, and white, a ſlender Embroidery of Veſſels; the *Pia Mater* all full of ſeeming turgid *Glands*, and a great Diſtention of *Lymphæducts* full of coagulated *Lympha*; the Subſtance of the Brain looſe and ſhrunk, very white, very little of the *cineritious* Colour to be ſeen; the *Corpus Calloſum* very flaccid; the whole Body of the Brain was ſhrunk about a third Part; between the two *Meninges* of the *Brain*, was near a Pint of extravaſated *Serum*, that muſt needs oppreſs the *Brain* very much; the *Ventricles* of the *Brain* full of *Serum*; the *Plexus Choroides* extreamly large, in Length as well as Breadth and Thickneſs; the *Nates* and *Teſtes* very ſmall and ſhrunk; the *Thalami Nervorum Opticorum* plump and fair; the *Corpora Striata* large and fair, full of large *Striæ* as I have ſeen.

The *Glandula Pinealis* was firm and fair, well coloured to look on, of the exact Figure and ordinary Size: Feeling of it, and finding it harder than ordinary, I preſt it, and found in it a *Stone* in a Film, or rather a *petrified Gland* in a Film. I do not remember I ever heard of ſuch a thing before; I am ſure, of all the *Brains* I have diſſected (and I may ſay I have diſſected more than an hundred) I never ſaw ſuch a one. The *Glandula Pituitaria* was half waſted; that Part that was left, was very hard and brittle, had not the Tone of a true *Gland*, nor Subſtance, according to my Obſervations, unleſs of a vitiated *Gland*; the *Cerebellum* ſeemed well enough, and all down the *Cauda Medullæ Oblongatæ*.

Before he became ſo mopiſh, he would ſay, he felt a certain Kind of Fierceneſs within him, which (it is probable) made him to utter ſome Kind of Vociferation when he was diſpleaſed at any thing.

Stones *found in the* Heart; *by* —— *n.* 5. *p.* 86.

LXXV. The *Belly* of the *Earl* of *Balcarres* being opened, the *Omentum* was found lean and ſmall; his *Liver* very big; the *Spleen* big alſo, filled with a black and thick Humour; his *Stomach* and Entrails all empty, of a Saffron Colour, diſtended with Wind only; the *Bladder* of *Gall* ſwelled with a black Humour; the *Kidneys* filled with a kind of grumous Blood. In the *Thorax*, the *Lobes* of the *Lungs* were all entire, but of a bad Colour; on the Left Side ſomewhat black and blue, and on the Right whitiſh; with a yellowiſh Knob under one of the *Lobes*.

The *Pericardium* being opened, there appeared none of that Water in which the *Heart* uſes to ſwim; and the external Surface of it, from the Baſe to the Tip, was not ſmooth, but very rough. It being cut aſunder, a Quantity of thick and inſpiſſate Liquor ran out: And beneath the Baſe, between the Left and Right *Ventricle*, two *Stones* were found, whereof the one was as big as an Almond; the other, two Inches long and one broad, having three Auricles or criſped Angles: And in the Orifice of the Right *Ventricle*, there was a fleſhy fattiſh Matter.

The whole Body was bloodleſs, thin, and emaciated, of a black and bluiſh Colour. The *Scull* being opened, both the *Cerebrum* and *Cerebellum* were big in proportion to the Body; and out of it ran much more Blood than was ſeen in both the other Regions together.

Stones *found in the* Lungs; *by Mr* Ch. Kirkby. *n.* 71. *p.* 2159.

LXXVI. A Boy near *Dantzick*, about 19 Years old, who had been from his Cradle diſpoſed to a *Conſumption*, accompanied with a continual Coughing, great Emaciation, and continual Heat, and labouring under this Diſtemper, died. Being opened, a great Quantity of watry Matter ran out of the *Abdomen*, of a chylous Conſiſtence; almoſt all the Glandules of the *Meſentery*, through which paſs the *Venæ Lacteæ*, were extraordinary great and hardened beyond the Hardneſs of a *Schirrus*. The *Lungs* were grown to the Breaſt round about, almoſt inſeparable, full of purulent Ulcers, but more eſpecially the left Side, obſtructed and filled with much *Gravel* and ſmall *Stones*; yea, whole Pieces of the *Lungs*, eſpecially the Extremities, about the Thickneſs of a Finger and more, were hardened into a *ſtony* Matter.

Stones *found in the* Gall-Bladder; *by* Mr. J. T. *n.* 209. *p.* 111.

LXXVII. After throwing up the *Sternon* of a Woman, I found the *Lobes* of the *Lungs* extreamly turgid, and its Veſicles implete with a grumous Blood. Their inveſting Membrane in the upper Part adhered firmly to the *Pleura*; the Right *Ventricle* of the *Heart* was filled with a large Quantity of coagulated Blood; but the Left ſeemed exſanguious; and I obſerved a Stagnation, and great Extravaſation of Blood upon the Right Side of the *Pleura*. Beneath the *Diaphragm* I found the *Ventricle* and *Inteſtines* much inflamed: The *Omentum* fair and large: The *Spleen*, to Admiration, ſo augmented in Bulk, that I ſuppoſed it weighed not leſs than 2 or 3 Phyſical Pounds: Upon cutting through its Body, there was diſcharged ſeveral Ounces of a very fœtid and putrified Blood. The *Liver* alſo was much larger than uſual, but its *Parenchyma* firm and ſound.

The *Veſica Bilaria* ſeemed full of *Bile*: But more curiouſly examining of it, I found a *Stone* very beautifully cruſted over with *chryſtalized Salts* of various Figures, conical, cubical, pyramidal, &c. The one half of it lay immerſed in *Bile*, whoſe Quantity was inconſiderable; for indeed this *lapidious* Concretion took up the whole Cavity of the *Bladder*, and weighed, immmediately after it was taken from its Receptacle, 2 *Dr.* 15 *Gr.*

We diſcovered in one of the *Kidneys* a large *Abſceſs*, and diſcharged a great Quantity of wheyiſh Matter.

Stones *found in the* Stomach, Kidney *and* Gall-Bladder; *by* Mr. William Clerk. *n.* 250. *p.* 95. *Fig.* 41.

LXXVIII. *An.* 1690, A Lady, who had been drinking the Waters at *Moffet-Wells* in *Annandale*, in *Scotland*, by Advice of her Phyſicians, for a continual Vomiting, and the *Dolor Nephriticus*, died there in a Fit of Vomiting. Upon diſſecting the *Stomach*, I found a *Stone* of the Bigneſs and Form as in the *Figure*. The Corner *a*, was almoſt fixed in the *Pylorus*, ſo that the Paſſage from the *Stomach* to the *Inteſtines* was near quite ſhut up. The Subſtance of this *Stone* is a little ſpungy, weighing about 8 ½ *Dr.* In the Left *Kidney* I found alſo a *Stone* of the ſame Subſtance, weighing about 5 *Dr.* and in the *Gall-Bladder* I found ſeveral *Stones*, weighing 2 *Drams*.

I am apt to believe, that ſome extraneous Body gave Origin to that in the Stomach, as it frequently happens even in thoſe extracted from the *Veſica Urinaria*: Thus an Iron Tag, a Leaden Bullet, &c. have been found the Kernels of ſeveral *Stones*. And that ſeveral extraneous Bodies are ofttimes found in the Stomach, being ſwallowed over, either wilfully, or by accident, we have the Authority of *Sennertus* and others. And one Mr. *Cameron*, who ſome Years ago, in a Frolick, ſwallowed Half a Crown, is alive to this Day, and finds no great Inconvenience thereby.

Lib. Prax. 3. *par.* 2. *Ser.* 1. *Chap.* xv.

Theſe *Stones*, generated in the Stomach, excite horrid Pains; but there are ſcarce any clear Signs by which they can be diſtinguiſhed from others, except the Continuance of the Pain; ſometimes they are ejected by Vomit; and ſometimes they adhere to the Bottom of the *Stomach*, of which we have a notable Inſtance in *Horſtius*.

But *Stones* are alſo formed in all other Parts of the Body, of which we are aſſured by manifold Obſervations and Experience; as in the *Brain*, *Kidneys*, *Ureters*, *Gall-Bladder*, *Tongue*, &c. and ſome are voided *per Anum*: But more ordinarily *Stones* are formed in the *Kidneys* and *Bladder*; becauſe theſe Veſſels are more properly deſigned to ſeparate and contain the *Serum* of the Blood; and for that Reaſon *Stones* in the *Reins*, and *Veſica Urinaria*, are more troubleſome to Perſons afflicted therewith, than in any other Part of the Body: 1. Becauſe the Parts are more ſenſible; 2. Becauſe they ſtop the Paſſage for evacuating the *Serum*, that is continually ſeparating from the Blood, and, by Conſequence, diſtend the Veſſels, and ſo cauſe horrid Pains.

Lib. Inſtit. p. 141.

Vid. Sup.

LXXIX. A Carpenter near *Hallifax*, about 40 Years old, of a ſtrong Habit of Body, and very laborious in his Calling, made a great Complaint to me of the ſad Torture he had ſuffered by reaſon of two *Stones* he had voided by *Stool*, about *Chriſtmas* 1684. He perceived no Diſorder in his Body till within 5 or 6 Days that the firſt came away; then he began to complain very much of a Pain in the Belly, much reſembling the *Cholick*, and of a Stoppage in the *Inteſtines*, not much unlike that in a *Teneſmus*, having frequent Provocations to go to Stool, but to no Purpoſe upon Trial. He took little or no Reſt in all that Time; his *Stomach* retained ſcarce any Meat or Drink it received; till, in the Concluſion, one of the *Stones* came into the *Inteſtinum Rectum*, where it lodged for a Day's Time; then coming within the Reach of his Finger, he drew it out by Force, and then he was preſently very well. A Fortnight after that the other began to move; which occaſioned a Pain beyond the former, in Proportion to its Bulk, and kept him upon the Rack about 8 Days; during which Time there was an abſolute *Suppreſſion* of *Excrements*; aud when the *Stone* came into the *Rectum*, it continued near two Days within the Reach of his Finger, with which he could not draw it out by any Means; till at length he bent a ſmall Piece of Iron into the Form of a Hook, with which rude Inſtrument his Servant drew it forth with much ado, and not without wounding the rugous Coat of that Part. After that was gone, he ſoon recovered his former Condition.

About 7 Years before, the very like Caſe had befallen him, voiding two *Stones* after the ſame Manner, and about equal Bigneſs.

Stones *voided by* Siege; *by* Sam. Threapland. *n.* 170. *p.* 961.

LXXX. *G. Elliot* of *Mendleſham* in *Suffolk*, a pale, middle-aged, full-bodied Woman, ſorely afflicted for ſome Years with a Torment of the Bowels, was prevailed with by a Neighbour, who had ſuffered much in the like Caſe, to ſwallow two fit *Bullets*; whereupon ſhe found (as he had done before her) preſent Eaſe. But afterwards her Pains returned, and increaſed, and ſhe having many Conflicts for about 15 Years, then applied herſelf to my Apothecary, Mr. *Gibſon* of *Stow-market*, who adminiſtred to her, in the Fit, a

A Bullet *voided by* Urine; *by Dr.* Nath. Fairfax. *n.* 40. *p.* 803.

Doſe of Lady *Holland*'s Powder, which ſhe took in Poſſet-drink in the Morning, was moved gently by it in the Afternoon, ſpent that Night in Torture of Body with Vomitings, and next Morning, during the Uſe of the Chamber-pot, together with the *Urine* there came ſomething from her, which gave a twang againſt the Sides of the Veſſel. The *Urine* being poured off warily, there was left in it a heavy (and to appearance) gravelly *Stone*, of a Colour between yellow and red, near as big as one's Thumb's End (as ſhe confidently aſſerts to me) but making uſe of an Hammer, and knocking off the outer Parts of its Cruſt, they came at a *Bullet* encloſed in it, of a kind of brazen Colour on the Outſide; but cutting a little with a Knife, it proved *Lead* within; which being diſcovered could eaſily be accounted for. Aſking her, If no Enquiry had been made for ſuch a *Bullet*'s coming from her before? She told me, That ſome Days after ſhe took them, the Stools had been ſlightly examined, but finding neither, they gave over ſearch. She being further aſked about the Bigneſs of the *Bullet?* She told me, it was apparently bigger when ſhe took it, than when ſhe voided it. The State of her Body, in reference to the *Stone*, being enquired into, ſhe ſaid, That ſhe had, before and ſince that befel her, been a Voider of abundance of red *Gravel*, and particularly about three Years after ſhe took them, ſhe voided a conſiderable reddiſh *Stone*. When I aſked her about the Manner of affecting her Body at the coming forth? She anſwered, It was much like a common Fit of the *Stone*, only it held her longer (laſting ſome Weeks) bowed her ſadly forward, as a *Stone* often does in the *Ureters*, provoked to Vomitings, and particularly ſhe felt it croud lower and lower from the *Kidney* to the *Bladder* in the Left *Ureter*. Aſking her farther, Whether ſhe was ſure, it came by the Paſſage of *Urine*, and not by *Siege?* She aſſured me ſhe was not miſtaken as to that And indeed, the *gravelly* Coat, which the *Bullet* hath, ſhews ſufficiently whereabout it was lodged. Inquiring alſo, Whether the other *Bullet* was come from her? She ſaid, No; for ought ſhe knew it was ſtill in her Body. And as to her State ſince this Evacuation, ſhe ſaith, That ſhe hath had ever ſince more *Stone-Cholick* Pains, but none in ſo high a Degree as before.

The main Uſe I would make of this Inſtance, is to ſtrengthen a Conjecture I have had a long time, of ſome other Paſſage from the *Stomach* to the *Bladder*, beſides what Anatomiſts have hitherto given Accounts of: For that this *Bullet* never came at the *Ureters* through the Veins, Arteries, Nerves, *Lymphe-Ducts* (the only Veſſels that can be charged with it) is, I think, beyond Diſpute. If it ſhall be ſaid, That Nature, when put to Shifts, finds out ſtrange Conveyances to rid the Body of what is extraneous and offenſive to it, becauſe many Inſtances are known making that good; yet I think it not ſo pertinently urged, foraſmuch as ſome other Inſtances ſeem to ſide with it, which cannot be taken off by the ſame Evaſion; *viz.* Many do find, that drinking 4 or 5 Glaſſes of *Rheniſh* (for Inſtance) within leſs than a quarter of an Hour, they ſhall have a ſtrong Liſt to make Water, eſpecially if the Body hath been agitated. Now that it ſhould paſs through the Lacteals, Veins, Heart, and Arteries, and be

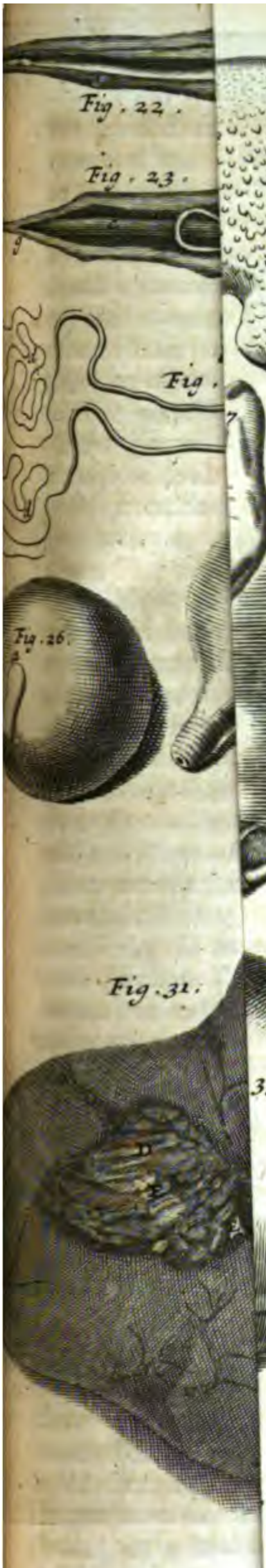


Fig. 22.
Fig. 23.
g
Fig.
Fig. 26.
a
Fig. 31.
D
E
A

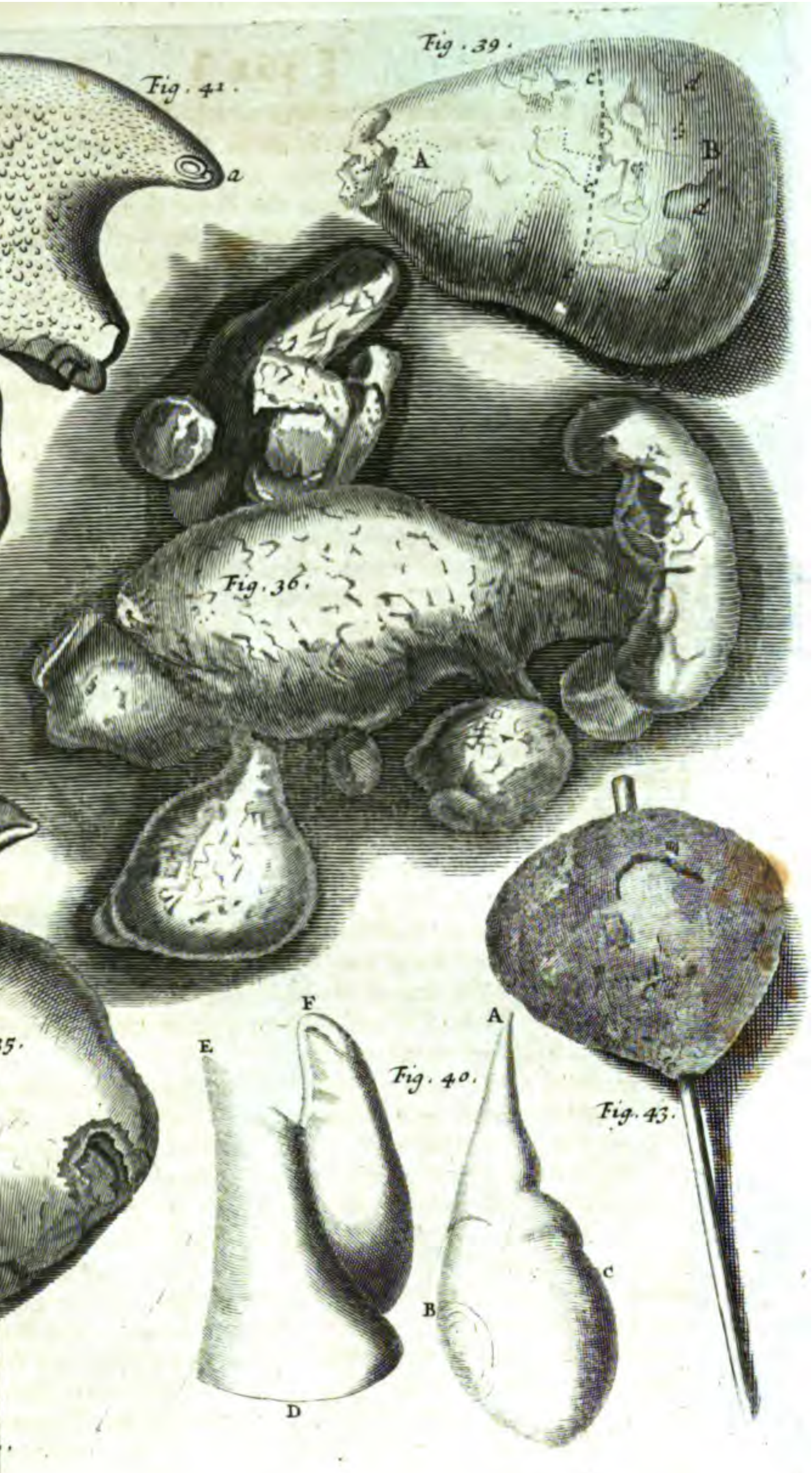


Fig. 41.
a
Fig. 39.
A
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C
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d
Fig. 36.
35.
Fig. 40.
E
F
D
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B
C
Fig. 43.

be ſtrained from the Blood in ſo ſhort a time, it is, to me, ſcarce conceivable.

But ſurely this ſhorter Paſſage (wherever it is) is as natural as that by which it ſhould have gone, had it ſtaid longer in the Body: Not to ſay how little it ſavours of the Rankneſs of the *Kidneys*, and how much it reſembles that which it was before it was taken into the Body. And, methinks, the Conveyance of the *Milk* into the *Breaſt*, hath much Affinity with this of the *Urine* into the *Bladdor*; the ſudden preſſing whereof into the Paps after the Nurſes drinking ordinary Milk, could no more be explained by the ordinary Doctrine of *Circulation*, than this of the *Urine* into the *Bladder*, till the ſhorter Cut was hit upon by the *Ductus Thoracici*; though ordinarily it may be ſtrained from the Arteries, as the *Serum* alſo in the *Kidneys*; only in a Milk-flood Nature finds ſome other Channel there, as here in a Water-flood.

LXXXI. A Gentlewoman (at *Bath*) about 28 Years of Age, very fat, and corpulent, after having been long troubled with frequent, and ſometimes violent Vomitings, fell at length into a *Fever*, and died in few Days, and on a ſudden. I opened the Body, and quickly found what might account for her long Vomiting (and perhaps her *Fever* and Death too) *ſcil.* an Ulcer in the *Pancreas*, which had ſphacelated ſome Part of the *Stomach* and Bowels that lay neareſt to it. Her *Kidneys* were covered with a prodigious Quantity of Fat; which removing with my Hand, and reaching one of the *Kidneys*, I felt ſomething prick my Finger in the lower Part of the *Kidney* where the *Ureter* is inſerted. I preſently concluded it to be a *Stone*, and took it out, with an abundance of mucous bloody-Matter about it. I found not ſo much as *Gravel* (much leſs any *Stone*) in either of the *Kidneys*. When I had waſhed off the Mucus that was about the ſuppoſed *Stone*, I found it to be a ſmall *Shell*, very finely wrought; in the Hollow of it, there was a mucous ſlimy Matter, not at all unlike the Subſtance of a *Snail*, as to Conſiſtence, but of a bloody Colour.

A Shell *found in the* Kidney; *by Dr.* Rob. Pierce. *n.* 171. *p.* 1018.

Fig. 42, repreſents this *Shell* ſomewhat magnified. Thoſe indented Checquers, are every other a little depreſſed and elated; and very exactly wrought. There are 6 or 7 Spiral Lines, or Rounds, in the *Turban*.

Fig. 42.

LXXXII. This *Stone* was cut out of the *Bladder* of a Boy at *Paris*; by M. *Colo*. The *Iron-Bodkin*, to which the *Stone* grew, and which paſſes through the Middle of it, had been thruſt up into the *Bladder* by the Boy himſelf, about 2 Years before the Inciſion.

A Stone *grown to an* Iron Bodkin *in the* Bladder; *by Dr.* M. Liſter. *n.* 168. *p.* 882. *Fig.* 43.

LXXXIII. *Dorcas Blake* (in *Dublin*) a full-bodied ſanguine Maid, about 20 Years old, was much troubled with a Hoarſneſs laſt Winter, for which ſhe was very deſirous to take a Vomit; but her Friends not conſenting to it, ſhe endeavoured to provoke one, *Jan.* 5, 1694, by thruſting her Finger into her Throat; which not anſwering her Deſires, ſhe drew an *Ivory Bodkin*, of 4 Inches long, out of her Hair, and thruſt the ſmall End for-

A Bodkin *cut out of the* Bladder *of a Woman; by Mr.* Proby. *n.* 260. *p.* 455.

ward into her Throat, upon which ſhe heaved ſo often, as to put her out of Breath, and obliged her to ſtand upright to draw ſome Air, which ſhe did without taking the *Bodkin* out of her Throat, and at that Inſtant it ſlipt out of her Fingers, and paſſed into her Stomach. She found no immediate Inconvenience; but the next Day about Noon, ſhe felt a ſharp pricking Pain in the Right Side of her Belly, lower than the Navel; and towards Evening ſhe felt the Pain nearer her Right Groin than before, which obliged her to go to Bed, where ſhe lay reſtleſs all that Night, by reaſon of the exceſſive Pain. *Jan.* 7. A Midwife ſearched her, and ſaid, ſhe felt the End of the *Bodkin*, but thought it was in a Gut. *Jan.* 8. At Night ſhe ſent for me. In ſearching her by the *Anus*, I could not find it; but putting my Finger into the *Vagina Uteri*, I felt the *Bodkin*: And becauſe ſhe complained of a Difficulty in voiding her *Urine*, I made uſe of my *Catheter*, and felt it, as I conceive, in the *Bladder*; but immediately trying a ſecond time, I could not find it. Within a Fortnight after, it was very plainly to be felt: And about 10 Days after this (her Body being duly prepared for the Operation) I attempted to extract it, after the ſame Manner as I do *Stones* from Women. But having introduced my *Forceps* into the Neck of the *Bladder*, and very readily taken hold of the *Bodkin*, I could not move it. I then paſſed in my Finger through the Dilatation into the *Bladder*, and tried to bring the whole *Bodkin* into the *Bladder*, but could not; nor could I turn it one way or another, but round like a Spindle; the ſmaller End (as I imagine) reſting upon the *Iſchium*. Finding all my Attempts to be fruitleſs, I deſpaired ever to effect it this Way, which made me deſiſt from farther Trial. But after ſome time her Pains increaſing, ſhe prevailed upon me, by her daily Importunity, to attempt the extracting of it in the Manner of the *Higher Operation* for the *Stone*, which was as follows, Dr. *Maddin*, Dr. *Molineux*, and Dr. *Smith* being preſent. Having placed her in a convenient Poſture, I put my Finger into the *Vagina Uteri*, and felt the *Bodkin* lying cloſe to it on the outſide; whilſt I held my Finger there, I preſſed with my Left Hand above the *Os Pubis*, where I felt the Head, or thickeſt End of the *Bodkin*. I then removed my Right-Hand, and deſired Dr. *Smith* to put his Finger into the *Vagina*, as I had done before, and preſs hard againſt the *Bodkin*; which he did, and held it very firm and ſteady, whilſt I made an Inciſion about an Inch and half in Length, on the Outſide of the Right *Muſculus Rectus*, till I came to the *Bladder*. I then paſſed my Fore-Finger and Thumb into the Wound, and got hold of the Head of the *Bodkin* (the Subſtance of the *Bladder* only being between) upon which, with a ſmall crooked *Biſtory*, I cut the *Bladder*, and by gently preſſing my Finger and Thumb, the *Bodkin* ſlipt out of the *Bladder* between them, by which I very eaſily extracted it. I dreſſed the Wound, and put her into Bed, and in leſs than a Month, by God's great Bleſſing, ſhe was perfectly cured.

June 10, 1695, The young Woman went before the *Lord Mayor*, and made Oath, That the above Relation is true in Subſtance, and that ſhe did ſwallow the *Bodkin* therein mentioned.

The *Bodkin* was cut out of her *Bladder* that Day nine Weeks that ſhe ſwallowed it. There was but half of the *Bodkin* in the *Bladder*, which was incruſtated with a gravelley *calculous* Matter; the other Half was out of the *Bladder* in the *Pelvis*, the Point reſting upon the *Iſchium*.

LXXXIV. A Boy of 5 or 6 Years of Age, near *Aberdeen*, was cut for a *Stone*; which being by Accident broke a little, there was ſeen within it a *Flint-ſtone* ſhaped like to that of a Piſtol, with the *Calculus* cruſted about it. I ſaw this *Gravel-ſtone* with my Eyes, having the *Flint* in one Side of it, but cruſted above. That the *Flint* has not been formed in the *Bladder*, but that this might have been occaſioned by the Boy's ſwallowing of the *Flint-ſtone*, ſeems probable from another ſtrange Inſtance of a Man, in the ſame Country, his voiding with his *Urine* a ſmall *Piſtol-bullet* cruſted over with *calculous* Matter, after the ſame Manner.

A Stone *from the* Bladder, *with a* Flint *in it; by Dr.* Geo. Garden. *n.* 266. *p.* 689.

A Piſtol-Bullet *cruſted over, voided by* Urine.

LXXXV. I had an Account of Sir *William Elliot*'s piſſing *Hair*, from Sir *Archibald Stevenſon* and Dr. *Pitcairn*, his Phyſicians; and after his Death I ſaw the *Stone* that was taken out of his *Bladder*, which was about the Bigneſs of a Gooſe-Egg; the *Stone* was hard and heavy, and for the moſt Part covered over with a Scurf, not unlike the Lime-mortar of Walls, and in the Chinks of the Scurf there were ſome *Hairs* grown out. It was thought the other *Hairs* he piſſed in his Life-time, which were a great many, and ſome of an extraordinary Length, did grow out of that *Stone*; becauſe when the *Hairs* would hang out of his *Penis*, as they did frequently to his great Torment, they were obliged to pull them out, which was always with that Reſiſtance as if plucked out by the Root.

A Stone *from the* Bladder, *with* Hair *growirg on it; by Dr.* Jo. Wallace. *n.* 266. *p.* 688.

LXXXVI. A pretty *Spaniel* (in *Italy*) 2 Palms and a half high, and an excellent Setter for Quails, being kept tied, as ſuch *Dogs* are wont to be, would rather have burſted than urine or dung in the Place where he was kept. By reaſon of his aptneſs to bite, he was cut when he was 5 Years old; and 2 Years after that he began to urine with much Difficulty. Whereupon, as often as he was let looſe, he ran preſently into the Garden, and fell to eat of *Pellitory of the Wall*, and *Fig-leaves*; which *Matthiolus* and others obſerve, to provoke *Urine*, and cleanſe the *Reins*. This Diſeaſe continued upon him for 5 Years together, ſometimes with that Violence, that his Maſter had him ſyringed, and anointed with *Oil* of *Scorpions*, and uſed other Remedies to help the poor Creature. At length he died, at 12 Years of Age; and being opened, there was found in his *Bladder* a *Stone* weighing an Ounce, of an irregular Figure, white, yet here and there with ſome reddiſh Specks; and in the Bottom of the *Bladder* was found Store of ſmall white *Gravel*; and in the Mouth of the *Urinal-Paſſage*, a *Stone* as big as a great *Pine-Kernel*, white and tender. The reſt of the Body was all ſwelled.

A Stone *in the* Bladder *of a Dog; by* S ——— *n.* 84. *p.* 4094.

LXXXVII. There was lately a *Stone* of a very extraordinary Bigneſs found in the Body of a *Spaniſh* Gelding, about 13 or 14 Years old, which died in the *Academy* of M. *de Bernarday*, the Weight of it being 4 Pounds, of a

A Stone *faſtened to the Back-bone of an* Horſe; *by* S—*ib.* & *Ph. Col. n.* 7. *p* roundiſh Figure, a little flatted; its longeſt Diameter was 5 Inches, and its ſhorteſt 4: It was of the Colour of an Olive, but a little inclining to a brown, marked with ſeveral red Spots reſembling coagulated Blood; radiated circularly with black and white Veins and Waves; but for the reſt of it, ſo delicately poliſhed, that it reflected the Images of the Objects about it. It was found invelloped in a Membrane of Fat, and faſtened by two Ends to the *Spine* of the *Back*, near the *Kidneys*: It was more than 12 Hours after the *Horſe* was dead before it was taken out of his Body, when it was found very hot, though the Body of the *Horſe* was quite cold; and it retained a conſiderable Heat about 6 Hours after it was taken out.

A Stone *taken out of the Belly of a* Horſe; *by Dr*. H. P. *Ph. Col. n.* 7. *p.* 191.

LXXXVIII. Not long ago, there was a *Stone* of a very large Size taken out of the *Belly* of a *Horſe* at *Lambeth*, which weighed four Pounds four Ounces, about the Bigneſs of a Man's Head, and ſomething of its Shape, but oblong, and more flat than round. The Perſon who took out the Stone, and I believe was ignorant of the Parts and their Situation, affirmed to me, that he found it between the *Bladder* and *Rectum*, and it is poſſible he might be right. For the *Stone* on one Side was plain and ſmooth, occaſioned by the Urine paſſing continually that Way, not without ſome Difficulty upon Account of the Straitneſs of the Paſſage; on the other Side, where it adhered to the *Bladder*, it was rough and unequal like a *Pumice Stone*, which increaſing daily in its Size and Bulk, like a Milſtone, had wore out the tender Coat of the *Bladder*, ſo that nothing remained of it. And perhaps, if they had adverted to it, they might have obſerved the Dung voided with ſome Difficulty upon Account of the incumbent Weight compreſſing the *Rectum* into an unuſual Figure. The Maſter who kept him twelve Years, ſays he was fifteen Hands high, and his Labour was to carry Cloth, dyed and undyed, backwards and forwards. It is a common Caſe, when we cannot account for a Diſeaſe, to ſuſpect every Thing, as in the preſent Caſe. In dying of Cloth a great many Minerals are uſed, as Copperas, Alum, and different Kinds of Salts, together with other Things of a like Nature taken out of the Animal and Vegetable Kingdoms. The Cloth ſtained with theſe Things, is taken while it is warm out of the Coppers, and heaped upon the poor Horſe, who groans under the Burthen and is quite fatigued. Here perhaps it might not be impertinent to enquire, whether from the Folds of the Cloth, preſſed and ſticking as it were together, there may not tranſpire ſubtle *Effluvia*, which being attracted ſlily in Inſpiration, contribute at leaſt in Part to the Concretion of the *Calculus*, and collect and unite the ſaline Particles like a Kind of Glue. What contributes not a little to confirm this Conjecture is that, that Liquor which Dyers frequently uſe, promotes Concretion very much by its vitriolick Spirit. This may be ſeen in many Places of *England* where that Spirit obtains, which lays hold of whatever comes in its Way, as Wood, Shells, Chaff, &c. and involves them in a ſtony Cruſt. Great Things are frequently made out of the leaſt, eſpecially if continued for a long while, or frequently repeated. If that Opinion, which continued long a favourite with the Antients, was not now grown quite obſolete, that the Heat of the *Kidneys* has the ſame Hand in making the *Calculus*, as the Fire has in burning of Bricks, it would be confirmed ſtrongly here, as the Horſe was daily oppreſſed with a great Heap of Cloth, laid upon his Back.

The Antients were ſo careful to prevent the *Kidneys* from ſuffering by too much Heat, that they defended their Loins only with looſe Linen, ſo that the Back with them was expoſed to the cool Air, and not the Breaſt. *Salmaſius* affirms, that the moſt Part of thoſe whom he had obſerved troubled with a *Stone* in the *Kidneys* only, uſed to ſit at Table with their Back oppoſite to the Fire. Very hot Weather indeed is hurtful to the *Kidneys* in another Reſpect, but conduces nothing towards producing a *Calculus*, unleſs it meets with Matter there that is apt to concrete. They had left off riding him for ſome Years, for it was with the greateſt Difficulty that he would admit either a Saddle, or Rider, upon his Back, as if his uſual and daily Load ſat lighter and more commodious; whereas a new Burthen irritated the Parts; or he had Sagacity enough to foreſee that, if he was put upon a Journey, the Load which, while he walked ſlow, lay quiet as on a Pillow, would occaſion far greater Pain, if he was obliged to go faſter. Something ſimilar to this is frequently ſeen in Men, who will carry a *Calculus* a long while ſuſpended *in æquilibrio* by certain Filaments, without ſuffering any great Inconveniency from it; but if theſe Filaments happen to break by any violent Motion or Straining, ſo that the *Calculus* falls down to the Neck of the *Bladder*, it raiſes ſuch acute Pains in that tender ſenſible Part, as to kill the Patient. The Horſe was fed conſtantly upon dry Hay, and for ſome Years had ſeldom or never enjoyed the Liberty of grazing in the Fields, where he might poſſibly have found ſome common, or even ſome particular Remedy, whoſe Strength and Virtue were diſcovered by the Senſe and Experience. For why ſhould we not allow them the ſame Sagacity as other Animals? A *Dog*, for Inſtance, when he finds he has eat too much, runs about, till he finds a particular Kind of *Graſs*, which ſets him a vomiting, and ſo relieves the Stomach of its Load. The *Stag*, as ſoon as he is wounded, flies to the *Dittany*, a powerful *Vulnerary*. And *Cats* when they are ailing, have Recourſe to the *wild Penny-royal*, which hence has obtained the Name of *Catwort* or *Cat-Mint*. This Horſe likewiſe uſed to fall away twice a Year, *viz. Spring* and *Autumn*, and his hind Legs eſpecially uſed to be ſo ſtiff and lazy, that he could ſcarce draw them after him; the Spirits quite ſinking under the Load. So you will frequently ſee a Limb from a violent Contuſion, deſtitute of Spirits, grow withered as it were, and become an uſeleſs Load. For eight or ten Days before his Death, he made no Water, the Stone filling up the Cavity ſo much, that there was no Paſſage left for the Urine. He threw himſelf upon the Ground, toſſed and tumbled about; kicking himſelf and the Ground with his Feet, and ſhewing all the Tokens of the moſt violent acute Pain. But what was moſt ſurprizing of all, during the whole Time that the Stoppage of Water held him, he would not drink a Drop of Water that was offered him; as if he underſtood by Inſtinct, that if the Water did not paſs, it muſt be heaped up in the Belly, and ſo increaſe the Pain.

A Stone *in the* Bladder *of an* Ox; *by Dr.* Johnſton. *n.* 101. *p.* 9.

LXXXIX. 1. *An.* 1671, the *Bladder* of a fat Ox being blown by a Butcher's Servant in *Pomfret*, there was ſomething obſerved ſticking to the Inſide with a duſkiſh Froth. Keeping the *Bladder* half blown, the Butcher's Son, who firſt diſcovered it, knocked with his Hand on the Side, and the Bottom of the *Bladder*, to make it ſettle to the Neck; and by ſhaking and ſqueezing it, got out the Froth, and about 200 little globular *Stones* of ſeveral Sizes. He rubbed the ſlimy Froth from them, and they appeared of a duſkiſh yellow Colour, and ſmooth. When dry, they were like *Seed-Pearl*, but more ſmooth, and of a perfect Gold Colour, and ſo continued. Viewed in a *Microſcope*, they appeared poliſhed, and without any Rugoſities. The Figure in moſt was ſpherical; in ſome a little compreſſed; the Colour like *burniſhed Gold.* I broke one or two of them with ſome Difficulty; and I found by the *Microſcope*, that it was only a thin Shell that was ſo *orient* and bright; the inner Side of which Shell was like unpoliſhed Gold. The inmoſt Subſtance was like brown Sugar-candy to the naked Eye, but not ſo tranſparent: The Taſte was not diſcernable. In *Spirit* of *Vitriol* they ſhrunk much and waſted, but continued their Colour (poſſibly by reaſon of the outward Skin, which, it ſeems, in theſe was as difficult to diſſolve as in true *Pearls.*) Likewiſe *Aqua-fortis* would corrode and diſſolve them tumultuouſly.

By Dr. M. Liſter. *Ibid.*

2. I did perſwade myſelf at firſt, that theſe *Stones* were ſome Inſects Eggs; but afterwards, when I had read that Account of ſeveral *Stones* found in other Animals, which Dr. *Wedelius* has publiſhed in the *German Ephemerides*, *An.* 1672, I was induced to believe them *Stones* indeed.

A prodigious Number of Stones *voided by a Woman at* Bern, *in* Switzerland; *by Dr.* Sigiſm. Konig. *Ph. Col. n.* 3. *p.* 68.

XC. *Margaret Lawer*, my Townſwoman, and a Woman of a good Character, in the *Spring*, 1678, when ſhe was twenty-one Years of Age, the menſtrual Diſcharge leaving her, was ſeized with various Complaints, and very acute Pains, in all Parts of her Body, with ſeveral Bliſters breaking out ſuddenly, of the Breadth of one's Palm. They were filled with a clear Lymph, and burnt violently, ſo that you would have taken them for St. *Anthony*'s Fire, and if they were not opened immediately, the Pain became inſufferable, ſo as to make her light-headed. And it was no ſooner healed in one Part, but it broke out in another. In order to be cured, ſhe was received into the Hoſpital (called the *Iſland)* where we tried all the Methods we could think of to remove the Cauſe of the Diſeaſe, which we took to be a particular Acrimony of the Lymph, attended with a kind of Stypticity in it, whereby it ſtagnated in the Subcutaneous Glands, and could not get through them; attempting by all Means to mitigate, reſolve, and evacuate that Humour, or give it another Courſe, but all to very little Purpoſe. At laſt however, we were led by Reaſon and Analogy to try a Salivation, which had the deſired Effect; ſo that, after a Cure of eight Months, ſhe was diſmiſſed the Hoſpital quite recovered, in the Month of *March*, 1679, and adviſed to drink the chalybeated Goat's Whey.

From this Time ſhe continued well in every Reſpect till the 3d of *January*, 1680, when the Bliſters began to appear again, and ſhe applied to the Magiſtrates to get in again to the Hoſpital, where ſhe was admitted the fifth, and we thought of nothing but repeating the former Method of a Salivation. But in the firſt Place it was neceſſary to prepare the Body for that Courſe, which we had ſet about, but had not yet begun to purge her, when, the 15th of the ſaid Month, there was a ſudden Revulſion made of the Humours from the Skin to the Bowels, the Bliſters immediately diſappeared, and the Cuticle adhered ſo cloſe to the Skin, that there did not the leaſt Mark of the Eruption remain. Although the Patient continued extremely eaſy for five Days, and thanked God for being ſo ſuddenly relieved from her Pains, yet I preſaged no Good from this ſudden Revulſion, ſuſpecting the ſharp Humours might fall upon ſome of the *Viſcera*, and therefore I ſtill plied her with Reſolvents mixed with Diaphoreticks, for fear of a Relapſe, or perhaps a worſe Diſeaſe.

On the twentieth of *January* a Group of Symptoms appeared, which mocked all Prognoſticks, *viz.* a Pain in the Loins, Bladder, Perinæum and Groins, Weakneſs, Want of Appetite, Nauſea, the Blood much inflamed, a Retention of Urine, the Pulſe quick and irregular, from all which we could conclude nothing but a *Nephritis*. Wherefore after bleeding, ſhe had an Emulſion of the cold Seeds mixed with Nephriticks, and a Clyſter of cold emollient Paregoricks was immediately injected, which was vomited up within a Quarter of an Hour, to the Amazement of every Body. The Clyſter was repeated and vomited up as before, together with a Quantity of Gravel Stones to about Half an Ounce, but without any Excrement. We tried bathing her, the *Semicupium*, applied Bliſters to her Joints to make a Revulſion of the Humours, and Anodynes and Reſolvents to the Loins and *Pubis*. The Bleeding was repeated on Account of the Heat in her Bowels, and the Blood appeared florid, inſipid, mixed with a little yellowiſh *Serum*, and ſoon coagulated. The Fever at laſt remitted, ſhe drank laxative Decoctions of Pulps, but threw them all up again together with the Broth or whatever elſe ſhe eat, mixed with a Quantity of Stones as hard as Flints, and little Cruſts or Fragments, very hard, like white Marble. Clyſters were tried again with the ſame Succeſs as before, except that a greater Quantity of Stones was thrown up; and whereas before they were only about the Bigneſs of Peas, they were now as large as Filberds, and ſoon there came up larger. Her Bladder pained her exceſſively, and ſhe had a violent Inclination to make Water; upon introducing the *Catheter* not a Drop of Urine followed, and the Inſtrument ſtuck as if it was glued in a Manner ſo that it required ſome Force to pull it out again; and upon handling it we found the Bladder to be full of *Mucus*. We ſuſpected, not without Reaſon, that there were Stones bred in the Kidneys, Bladder and Glands of the Meſentery, as we ſaw them plainly voided from the Stomach and Inteſtines. Her Belly was ſomewhat ſwelled, but not much, together with an Oppreſſion about the *Præcordia*, and Difficulty of Breathing, an acute, pungent, darting Pain in the Region of the right Kidney and the left *Hypochondrium*, and you might hear the Noiſe of the Stones rubbing againſt one another, either upon preſſing the Belly with the Hand, or in the Time of vomiting, and you might frequently obſerve Stones broke off by ſtraining from thoſe that were left behind in the Body. But what was moſt ſurpriſing of all, the Patient, during the whole Courſe of the Diſeaſe, remained in a good Habit of Body, and of a freſh, florid Complexion. We endeavoured all we could to hinder the Concretion of the Humours, ſearching after various *Menſtrua* in the volatile Preparations of Steel, and of the urinous Tribe; but except the Spirit of Nitre, which we uſed, there was none of them able to produce the Solution. And after uſing theſe and other Remedies, as Injections into the Bladder of various Decoctions, both of Minerals and the expreſſed Juice of Plants, as *Arſmart*, &c. ſhe found no Relief; but was obliged to have Recourſe to Anodynes, to relieve the exquiſite Pain occaſioned by the *Mucus*. At laſt, on the *ſecond* and *twelfth* of *February*, there were about four Ounces of green, thick Urine drawn by the *Catheter*; after which ſhe eat a little, and had no Thirſt. From the *twelfth* to the *fourteenth*, upon ſwallowing a Spoonful or two of Broth or Barley Gruel, or ſome liquid Medicine, ſhe vomited two or three Times a Day, from Half an Ounce to ſix Drachms of ſmall Stones. From this to the *ſixteenth* of *June*, viz. for four Months, ſhe neither eat nor drank; but as ſoon as ſhe offered to ſip only a ſingle Spoonful of Broth, ſhe was preſently taken with a vomiting of Blood, and a greater Quantity of Stones than before, ſo that we were obliged to reſtrain her both from eating and drinking contrary to her Inclination, for fear of ſtirring up thoſe violent Symptoms. Thus ſhe continued for the Space of four Months, without eating or drinking, or taking any Kind of Medicine, only every fifth or ſixth Day a ſmall Spoonful of the Oil of ſweet Almonds mixed with the Spirit of Nitre, which we found to be the beſt Reſolvent in this Caſe, and moſt agreeable to the Patient, ſo that in that Time ſhe took between nine and ten Ounces of it. As ſhe remained coſtive all this while, ſhe had ſeveral Clyſters given her, all which ſhe vomited up, and with them Stones of different Kinds, whitiſh, red, grey, rough, ſmooth, ſoft, hard and large, ſometimes homogeneous, or of one Subſtance, ſandy, flinty, or like Marble; ſometimes heterogeneous, compoſed of a Cement and Flint; ſome of them beſmeared with Blood, others with a chyly *Mucus*, and others free of both. She had a Difficulty in making Water, but only every tenth Day, altho' once in three Days there were two or three Ounces at moſt of a green *mucous* Urine drawn off by the Help of the *Catheter*; whereas there was no Supply for it but by Clyſters. By Means of theſe, however, the *ſixth* of *April*, the Urine ſeemed to be attenuated, and ſhe made about three Ounces of a bluiſh, thin, ſaturated Urine; but on the *ſeventeenth* again the Pot was filled with it of a greeniſh Colour, and one Half of it a greyiſh Sand diſſolved in it. Hence we concluded the Tartar to be diſſolved, but we were ſoon undeceived, when we ſaw the Pain and Symptoms ſo increaſe, as to bring on a *Delirium*, *Stupor*, Laughing and Singing, with a Fever ſhe was not ſenſible of, and very ſoon a violent Pain in the Loins, ſo that ſhe would have thruſt a Knife into it herſelf, if ſhe could have come by it. At laſt, obſerving the Head ſo afflicted with theſe Symptoms, I reſolved by all Means to ſtrike at the Root of the Diſeaſe, and move this Load if poſſible; for which Purpoſe, I gave her two Grains of *Mercurius Vitæ* diſſolved in cold Spring Water, the *twenty ſecond* of *April*, and three Grains the *ſecond* of *May*, but without any Succeſs, only that it made her throw up about ſeven Drachms of Stones at two Motions. As her Belly was ſo conſtipated, and in order to diſſolve the tartareous Matter, and promote a Spitting, the *eighth* of *May*, I ordered her four Ounces of crude Mercury, and the *tenth* ſix Ounces; but it paſſed again by the *Anus*, partly in the Bed, and partly in the Room: A Quantity of it that was gathered up, I keep ſtill by me. In this State of perfect Abſtinence ſhe remained till the *ſixteenth* of *June*, when I reſolved to drench the *Inteſtines* with a large Quantity of cold Water, with *Sal Polychreſt* diſſolved in it: I ſat by her on the Bed for two Hours, and made her drink ſix Ounces every Quarter of an Hour, till ſhe had ſwallowed three Pints of Spring Water; and by holding her Mouth cloſe ſhut, and reſtraining the Vomiting, in the Evening ſhe voided a Quantity of very groſs hard *Fæces*, which diſtended the *Anus* ſo much as to endanger a Laceration. Thus that Solution, which had been tried in vain for four whole Months by various Medicines, was brought about by ſimple Spring Water only. The *Delirium* now went off, and her Appetite returned; ſo we continued to uſe the Water, together with gentle Acids and bathing, but left off the third Day, Nature refuſing them. On the *fifth* and *ſixth* of *November* ſhe was taken with a Looſeneſs, but not at all violent, attended with Vomiting between whiles, ſo that ſhe voided Stones both Ways, ſeveral of which I have by me, weighing more than two Drachms; and you may eaſily believe, that thoſe rough, pointed Stones, could not be voided without Blood and a great deal of Pain. In the intermediate Time, that is, in the Month of *September*, as I plied her from the Time that ſhe began to eat a little with Aperients, Diureticks, Emmenagogues and Diaphoreticks, the *Menſes* and the ſame Kind of Bliſters as before broke out afreſh; whence I ſhould have had ſome Hopes of a Solution, or *Metaſtaſis* of the Morbifick Matter, if the Symptoms had not hitherto been altogether unaccountable; and as from that Time till the *fifth* of *November*, the Diſeaſe continued the ſame, the Belly was again conſtipated, the Heart oppreſſed, every Thing inverted, and the Excrements for the firſt Time began to be voided upward, all Hopes of a Recovery vaniſhed. However, by Means of a laxative Decoction of *Pulps*, this inverted Motion of the *Inteſtines* was removed, and ſhe was purged the *fifth*, *ninth* and *fifteenth* of *November*. Having recovered her Belly to its uſual State, but the Suppreſſion of Urine ſtill continuing, on the *fourth* of *February*, in the Year 1681, Neceſſity obliged us to introduce the *Catheter*, which brought nothing along with it; but immediately after calling for the Pot, ſhe voided, to the Surpriſe of every Body, eight Pints of a greeniſh, feculent Urine, with a ſtraining like that in Labour, but without any Stones. Although the Bladder was thus opened, yet inſtead of making Water in the ordinary Way, ſhe threw up three or four Ounces of fetid

Urine every ſecond or third Day till the *ſixteenth* of *May*, from which till the *thirteenth* of *September*, (during which Time ſhe uſed Baths and drank largely of Water with Spirit of Nitre) ſhe ſo far recovered as to look florid, eat moderately, and make about three or four Ounces at a Time of a clear yellowiſh Water, with a thin Sediment, and ſometimes mucous and bloody. She went to Stool every fourth Day, but the Excrement was hard and ſmall in Quantity, and ſhe now and then vomited, but did not throw up near ſuch a Quantity of Stones. In the mean Time that Burthen, which hitherto had layen upon the *Oeſophagus*, the Bladder now took its Share of, ſharp little Stones being frequently voided that Way. The Belly was a little ſwelled, with a painful Hardneſs in the left *Hypochondrium*, and right Region of the Loins, and when handled you could hear the Stones rubbing againſt one another.

From that Time the Patient lived tolerably eaſy, Nature performing all her Functions pretty well, till the *eighteenth* of *Auguſt*, 1682, when ſhe began to be troubled with Pains, Loathings, and Hiccups, but without any vomiting. Upon giving her a Cordial with ſweet Spirit of Nitre, the Symptoms ceaſed till the *twenty-ninth* of the ſaid Month, when ſhe was taken with violent Pains all over her Belly, toſſed and tumbled upon one Side and the other, had a Difficulty of Breathing, and hyſterick Paroxyſms, attended with Belchings, Palpitations and Yawning. I ordered her Anodynes and Antiſpaſmodicks, omitting Clyſters, which ſhe had a ſtrong Averſion at, upon Account of the Inverſion of the Motion of the Guts. To theſe Symptoms ſucceeded next Day Stretchings and Starting of the Limbs, convulſive Motions of the whole *Abdomen*, a Conſtriction of the Muſcles of the *Larynx* and *Fauces*, with Loſs of Speech, and at laſt a Labour Pain expreſſed with a loud Kind of Hiſs, whereby all her Limbs being contracted, ſhe voided a Stone by the *Anus*, beſmeared with Blood, which was followed next Day by two more a good deal ſmaller, attended with a Hemorrhoidal Diſcharge from the lacerated Blood-Veſſels. After this ſhe was, like a Woman lying-in, reſtored with Broths, aſſiſted with proper Cordials, and the Diſeaſe being ſeemingly overcome, ſhe got healthy and ſtrong again in a few Weeks.

But this Condition of the Patient, more tolerable than the preceding, was changed into a more painful one; for Stones not only heavier, but of a harder Subſtance and very angular, not bred ſingly neither, but coming as it were from a Quarry, were voided downwards intirely every three or four Weeks. Her Belly, which before was moderately looſe, began to be coſtive again, and one or two Days afterwards ſhe voided a Stone. She made but little Water, not at all anſwering to the Quantity ſhe drank, different in its Kinds, ſometimes very thick and turbid which ſeldom was ſuppreſſed, and before ſhe made Water after a Suppreſſion, there came away an angular Stone, of the Size of a large Bean, of the ſame Kind with the others in every Reſpect. Another Symptom, which before happened only at certain Intervals, now appeared daily, *viz.* in the Morning when ſhe found an Inclination to make Water, preſently after a Quantity of it had paſſed off by the Bladder, ſhe vomited the reſt with great Loathing, to about three or four Ounces, of the ſame Colour, Conſiſtence, urinous Smell, and even Taſte, as ſhe ſaid, with that voided by the *Urethra*; all which was confirmed by a chemical Examination of it. Her Belly ſwelled, and the Hardneſs and Noiſe of the Stones rubbing againſt one another, were to be obſerved not only in the left *Hypochondrium* as before, but in all the right Region of the Belly, ſometimes however deeper on Account of the Laxneſs of the Muſcles, and a great Pain about the Pit of the Stomach; ſhe eat and drank moderately, but what ſhe took chiefly, was prepared of Liquorice, Graſs-Roots and Barley, and ſometimes a little weak Wine. She ſtarted in her Sleep, had the *Menſes* ſeldom and in ſmall Quantity, but they did not quite leave her; her Pulſe was languid, quick, and ſtarting, as it were, differing according to the different Symptoms; the Reſpiration free, not ſtrong, but ſcarce perceivable; and ſhe continued ſenſible all the while. At laſt, the *twelfth* of *December* in the Year 1685, ſhe was ſeized with a Mortification the Length of a Hand-breadth in the right Leg, which was cured by ſcarifying and other proper Remedies. At preſent ſhe is troubled with a Baſtard Quinſey, owing to an Inflammation of the *Tonſils*, and a good deal of arterial Blood flows from the *Fauces*, perhaps the Forerunner of ſome large Stone that is to come away. After trying to bring about a Revulſion by Bleeding in the Feet, and Clyſters, there followed, the *twentieth* of *February*, an Evacuation of natural *Fæces* by the *Anus*; but the *twenty-third*, they were voided upwards mixed with oily Clyſters and a very bad Smell, but without any Stones; whence being afraid of a Suffocation, this Method was left off.

This ſurpriſing ſingular Caſe has employed a good many Heads to account for it. Analyſis teaches us that Stones are generated in the human Body, according to the Laws of the *Macrocoſm* or greater World, from active Principles, a connecting Salt, and a Mother Earth and Phlegm, combined variouſly together. And that they are generated ſometimes in the Glandular Parts and *Ducts*, is no new Diſcovery, as Authors of great Veracity teſtify, and I myſelf had Occaſion to obſerve in the *Year* 1677, in the Caſe of *Katharine Scartenleib*, a young Girl, who beſides Stones, which ſhe had in the Bladder and Kidneys, coughed up a great Number of ſmall *Gravel Stones*, and died of a *Conſumption of the Lungs* in our Hoſpital. On the other Hand, *Katharine Blaſer*, in the *Year* 1680, after voiding a great deal of Sand and Concretions like Lime mixed with *Mucus* by Stool, was perfectly recovered in the ſame Hoſpital. Mr. *Jo. W.* one of the chief Magiſtrates, ſubject to the Gout, in the Month of *July*, 1683, had both the *Ureters* obſtructed with Stones, whereby the Urine being pent up, he died of an Apoplexy, the *ſeventeenth Day*, of the Diſeaſe, neither Bleeding, various Hydragogues, nor Lithontriptick Medicines giving him any Relief. Thoſe Stones I extracted, and found them of quite a different Subſtance from thoſe of my female Patient, and ſo impregnated with Oil as not to be diſſolved by any acid Spirit. The left Kidney was twice, and the right one three Times larger than the ordinary Size, the Coats being dilated; they were diſtended with *Serum*, and had a great many ſmall, brown, rough Stones ſticking in them, which when cut out had a round Point, perhaps made ſmooth in the Duct, and of the Figure of a ſmall Acorn. And Mr. *Albert Baurenkoningius*, a very expert Surgeon in Town, cut lately from the *Tonſils* of a young Girl, *Mary Haffner*, to the Number of thirty-two Gravel Stones. Beſides, there is a Hiſtory communicated by the celebrated Dr. *Selarey*, of *Gall Stones*, very large conſidering the Straitneſs of the *Ductus Choledochus*; and another of a *Jew's Son*, of eleven Years of Age, at *Weinheim* in the *Palatinate*, who paſſed ſmall Stones of different Kinds, and ſome of them flinty, both by the *Anus* and *Urethra*. This Hiſtory was communicated to me in a Letter from Secretary *Zweifelio*, at *Heidelberg*.

But though to outward Appearance they reſembled one another very much, yet as they differed greatly in Subſtance, I examined them phyſically.

1. By *Solution:* And having poured upon them *Spirit* of *Sulphur*, *Vitriol* and *Vinegar*, there began a Kind of *Efferveſcence*, eſpecially in thoſe thrown up from the *Stomach*, which were of a looſer Texture and more friable Subſtance; but it ſtopt as ſoon as the acid Particles had entered the crooked Pores of the Stone, and did not diſſolve it. The *Spirit* of *Sal Armoniack* made no Manner of Impreſſion upon it, and in whatever Shape it was tried, remained quite at Reſt with it: But the ſtrong *Spirit of Nitre* ſoon overcame it.

2. By *Diſtillation* by the *Retort:* Theſe thrown up in Vomiting had a little *Volatile Salt*, Spirit and Phlegm, a great deal of Earth, and almoſt no fixed Salt; but thoſe voided by the *Anus*, which were of the ſame Figure and Subſtance with thoſe which came from the *Bladder*, had more of a *Volatile Salt*, with a little ſub-acid Phlegm, but a ſtrong urinous Spirit, a moderate Quantity of a fixed Salt, and a great deal of Earth. Six Ounces of theſe Stones gave five Ounces and two Drachms of *Caput Mortuum*, hardly half a Drachm of *Lixivial Salt*, five Drachms and an Half of Phlegm and Spirit mixed with *Volatile Salt*, ſome Parts of them adhering to the Sides of the Receiver. This Liquor taken all together, and mixed with a like Quantity of *alcalized Spirit* of *Wine*, and diſtilled in an Alembick with a ſmall Degree of Heat, left two Scruples and an Half of urinous *Volatile Salt* in the Head of the Veſſel.

3. By *Precipitation:* The diſtilled Liquor, by adding *Spirit* of *Vitriol* to it, was turned into a red Tincture, and at laſt growing thicker, depoſited a Kind of Sediment. But the ſame *Spirit* of *Vitriol*, added to the *Caput Mortuum* left after Diſtillation, or to the *Lixivial Salt*, raiſed the ſame Kind of impetuous *Efferveſcence*, as when it is mixed with Salt and Oil of *Tartar*.

Thus thoſe Stones were compoſed of a great deal of Earth, a ſmall Quantity of a *Volatile Salt*, with a very little acid, which was ſubdued and elaborated with the *urinous Salt* and *Spirit*, as is plain from the *Spirit* of *Sal Armoniack*, which is of the ſame Nature, and being mixed with acid Particles, blunts, ſweetens, and combines them, ſo as they cannot be reſolved again.

Hence we may conclude, that the *Lixivial Salts* in this Patient were of the ſame Nature with the *Salt* of *Tartar*, and a *Matrix* being found, and an incorporating Acid meeting with it, they formed theſe after the *Effervеſcence* was quieted, in the ſame Manner as the *Spirit* of *Vitriol* by penetrating the *Salt* of *Tartar* with its ſharp and flexible Particles, deſtroys it, but at the ſame Time combines and converts it into ſomething of its own Nature. It had no Effect upon theſe Stones, as they were already concreted; but a fixed Salt, which has its combining Particles carried off by the Fire, it reduces to its own Nature, and makes it concrete. On the other Hand, the *Spirit* of *Nitre*, though it is likewiſe acid, yet being combined with a very ſubtile Salt compoſed of very rigid, penetrating and inſeparable Particles, not only diſſolved all by one Quality, but hardened the Reunion by another; becauſe its rigid Particles, which were continually in Action, would not become pliable, ſo as to combine the Salts that were divided into another Nature.

But the urinous Spirit of *Sal Armoniack*, which is very like theſe Volatile Salts, but produced from fixed ones, not only remained quiet with the Matter of the *Calculus*, but united cloſely with it.

Hence we ſee, that theſe *Calculi* differ very much from the Stones ſent from the Kidneys, not only in the Place, but in the Manner that they are generated; thoſe of the Kidneys being formed from the Particles of *Serum* being either too rigid, or too large with Relation to the Pores of the Kidneys, and ſo by Degrees obſtructing theſe Pores in ſuch a Manner, as to allow only the ſlippery watery Particles to ſlide off, while the Volatile Salts ſwimming with the *Serum* are inſenſibly involved in it, and at laſt form a Stone. The firſt of which is confirmed by Experience in old Men, who having the Humours more thick, and the Veſſels leſs pervious, are very ſubject to this Complaint. The laſt again is confirmed by Diſtillation; for by diminiſhing theſe Stones ſo as to make them enter the tight Neck of a Retort, there comes off an urinous Spirit with much Volatile Salt and ſome Oil, and the Stones remain in the Bottom of the Retort unchanged in their Figure, but by being moved, they eaſily fall down into Aſhes, and are again eaſily converted into *Calculi* by pouring upon them the Liquor that was diſtilled from them. From which the Quantity of the *Volatile Salts*, and how they combine the other Parts of the Stone together, very plainly appears.

But where, and after what Manner, the ſmall Stones and tartareous Gravel are generated in our Patient, as ſhe is ſtill alive, can ſcarce be gueſſed at here, unleſs ſome Allowances be made for Conjecture.

The *Bliſters* under the Scarf-Skin, full of a *limpid Serum*, collected there from the cutaneous Pores being obſtructed, and the ſubcutaneous Glands not allowing it to go backwards, were owing to the Impulſes of the Blood, and not to its being at Reſt; for as ſoon as it appeared to be coagulated, it no longer produced any Bliſters, and beſides that Concretion muſt hinder its Motion. But that ſharp corroſive Quality and uſual Inſpiſſation of the Humours, is an Argument of an Acid predominating in the Body. And the Nature of this Acid is very difficult to find out, ſeeing by the leaſt Addition, Diminution or Motion the Humours are altered, as is evidently ſeen from the Blood being generated from Chyle, *Lymph* from *Serum*, and *Aqua Regia* from *Aqua Fortis*, and from other natural Mixtures. Thoſe Humours being variouſly and vitiouſly altered in their glandular Receptacles, and Places where they are ſecreted, produce Coagulations, when by ſtagnating the ſpirituous *Alkali* is exhaled, whereby they are inſpiſſated and become aceſcent: In the ſame Manner as Wine, which is analogous to Blood, after the ſulphureous Particles which were incorporated with the Acid fly off, is preſently converted into an *Acor*. And certainly what conſtitutes Sweet or Acid, is nothing elſe, than a ſmaller or greater Proportion of acute Particles mixed with the others, and a Retarding of their Action, as in *Sugar*, *Honey*, &c. Hence the Blood, although it is inſpiſſated, taſtes ſweet upon the Tongue. Nay, they even affect the Touch as they are more or leſs in Quantity, there being but a ſmall Difference between Titillation and Pain. The Glands therefore, eſpecially thoſe of the lower Belly, the Receptacles of the *Lymphatick Serum*, or of its Acid in this Caſe, are deſervedly to be blamed for that Fault, whereby the Humour, already heterogenous, hardly paſſes through its *Ducts*, and being thick paſſes ſlowly from the *Pancreas* to the *Duodenum*, and is rendered more acid. Hence the Cauſe of the Diſeaſe is rather to be attributed to theſe than to the *Uterus* (for naturally without Impregnation, the *Menſes* are not ſuppreſſed before old Age comes on) which in this Patient betrayed the firſt latent Effects, whence the Blood ſtagnating contracted a greater Taint, and nouriſhed greater Commotions; for ſubordinate Cauſes are not to be blamed here.

But the ſudden Diſappearing of the Bliſters may very well be attributed to the Reſolvent Volatile Medicines, by which we endeavoured to remove the Obſtructions. For by theſe Remedies there was not only a free Reflux allowed to the reſolved Humours by the *Duct* of the *Glands* now cleared from Obſtructions, but the *Pancreas*, the great *Receptacle* of *Phlegm* or *Pituita*, poured out its contained acid Humour with Force into the *Inteſtines*, there to be mixed with the viſcid *Chyle*, and afterwards with the whole Maſs of Blood, and ſo produced a morbid Diſpoſition in the Humours, which has continued till now. And indeed the Chyle can ſcarce be otherwiſe, conſidering its Principles, ſeeing the Patient is obſtinately given to drinking large Quantities of Water, in order to ſuppreſs the violent Heat of her Bowels. For though the Waters here are very wholeſome, yet when taken in too great Quantity they may produce Obſtructions in the *Glands* and *Ducts*. But how much the Bile contributes to this Putrefaction, or whether it has any Hand in it at all, can hardly be diſcovered, ſeeing it abounds with a Lixivial Salt, which was not to be found in the Stones. From what has been ſaid, it appears that the *Stomach*, *Inteſtines* and *Glands*, were the principal original Places where theſe Stones were formed, though they were formed in the *Bladder* too, but not originally generated there. For the Urine, thus infected by the Taint of the firſt Digeſtion, and being an Excrement of the ſecond, impregnated with a great deal of Acid Salt and thick Phlegm, by ſtagnating in the Bladder, produced Concretions there; whence both the *Mucus* and *Calculi*, without Admittance for any Thing beſides, or the Hope of reſolving them.

But whereas formerly ſhe vomited up ſmall *Flints* and various Kinds of *Cement*, and has thrown up nothing at all ſince, the Cauſe of this Phenomenon lies concealed in the Body; but the Force of Waters in producing and incorporating Stones is different, according to the Diverſity of the Subject that it occupies.

The *Weight* of them is known from our having preſerved them; for the Cauſe continuing ſtill to act, and the Subject ſtill diſpoſed to be acted upon, of Conſequence the Effects muſt be continued, ſo that at preſent they exceed ten Pounds. Thoſe which were firſt thrown up in vomiting, which were of a different Subſtance from the *Tophi* in gouty People, and leſs compact in their Texture, the Air did not diſſolve, as it does ſuch as have ſubtile Salts, by its Moiſture, but by moving their ſlender and leſs implicated Angles, inſenſibly reduced them to a very fine Powder: The ſame as we ſee happen to white Vitriol, dry rotten Wood, and other Bodies, from the Air. But on the other Hand, rectified Spirit of Wine, eaſily entring the ſlender Pores, and not vibrating like Air, ſupported the undiſturbed Fibres or Particles.

As to the *retrograde vermicular Motion of the Inteſtines*, this plainly muſt be owing to ſome of the larger Stones ſticking in the narrow Paſſage of the *Cæcum*, between the Extremity of the *Ileum* and the Beginning of the *Colon*; whence the muſcular Fibres of the Inteſtines being retracted, their Periſtaltick Motion muſt neceſſarily be inverted, and by ſuch a violent Cauſe as that of *Calculi*, the *Valve* of the *Cæcum* might either be puſhed back or entirely broke. This Paſſage then being laid open, why might not the ſtimulated Inteſtines puſh the Clyſters upwards without any hard Excrements? As you ſometimes ſee in cholicky Patients, the *fæces* ſticking in the Cells of the Inteſtines ſo much hardened, as that after they are voided they can hardly be diſſolved by boiling, far leſs by Clyſters. It is equally ſurprizing indeed, that this ſhould have happened, and continues ſo to do in the Inteſtines crammed as it were with Stones; but if you only obſerve the Variety of Figures in thoſe Stones; you will ſee that they are not conformed to the Cavity of the Inteſtines, but every where laterally, and even through the very *Foramina* with which ſome of them are perforated, there is a Paſſage left both for the Deſcent of the Chyle, and the Aſcent of the Clyſters.

Daily Experience teaches us, that the Colour and Compoſition of the Urine vary, according as it is more or leſs in Quantity; but it is not eaſy to account for that bluiſh Pellucidity of the Urine, contrary to the Order of Nature, ſtill increaſing; for the Urine, is more or leſs tinged according as it is more or leſs ſaturated with Bile, or it is thickened by the Admittance of various heterogeneous Particles, or from the ſpirituous being exhaled, whereby it is rendered opaque and virulent.

The

The Excretion of the Urine was hindered by the *Mucus* in the Bladder, glewing as it were the Neck of it, but we are not to imagine that the Bladder could contain eight Pounds if it had not been preternaturally diſtended, as I obſerved in a Girl, *Johanna Heuſchler*, in the *Year* 1672. I was called to her as an Aſcitick Patient, but inquiring into the Cauſe of the Diſeaſe, I found the Caſe to be an Inflammation in the Neck of the Bladder; wherefore I ordered, ſome Anodynes, and afterwards the *Catheter* to be introduced, whereby an incredible Quantity of Urine, *viz.* more than nine Pounds, was drawn gradually off, and the Swelling of the Belly ſubſiding, ſhe recovered very well. But that too great a Quantity of Water may be collected not only in the Bladder, but in the Kidneys and elſewhere, is plain from the Caſe of *J. W.* above related. Hence it might poſſibly happen, that the redundant Urine might make its Way through the Mouth of the *Cœliack* Veſſels into the Cavity of the Stomach, but to thoſe who examined the Thing more narrowly it appeared, that even when the Urine was not exuberant, it was thrown up that way ſometimes quite pure, and ſometimes mixed with a Portion of Chyle and Aliment. And if any Body will but ſeriouſly examine the above Caſe, he will find that even before that Symptom of vomiting Urine firſt appeared, there was nothing given to the Patient that could communicate an urinous Taſte to the Contents of the Stomach, and much leſs afterwards; nor in a Redundancy of Urine does Part of it always make its Way through the Blood Veſſels. From all which, ſomething may be conjectured to have happened in this Patient contrary to the Laws of Nature, and perhaps the Cauſe of the Generation of the *Calculi* being ſtill continued is not yet diſcovered, ſeeing the Stomach is daily clogged with new Gravel and a perverſe Ferment of the Humours; otherwiſe it muſt have been altered long ago by Medicines. This brings to my Mind a Caſe, which fell under my Care in the *Year* 1677, *viz. Eve Luber* a Citizen of *Bern*, forty Years of Age, in a violent ſtraining in Labour, while the Bladder was diſtended with Urine, and ſtrongly compreſſed by the *Fœtus* making its Way out, had the *Urachus* burſt, ſo that ſhe voided the moſt Part of the Urine by the Navel during the whole Time of her lying-in; but at laſt it cicatrized, and the Urine paſſed again in the natural Way. But from thoſe *Phenomena* which are natural and quite evident, there is nothing to be concluded with reſpect to ſuch as are preternatural and occult.

As to the Affair of *Abſtinence*, our *Lentulus* has treated on it in a Treatiſe which he dedicated to *James* I. *King of England*; but as neither the Cauſe of Perſpiration nor the Circulation of the Blood was known at that Time, he reaſoned variouſly about it. But reflecting upon this, that Men tranſpire, and that in Proportion to what is loſt, freſh Nouriſhment muſt be ſupplied, it was found out by *Staticks*, that there is more ſent off from the Body by *Perſpiration*, than by all the other ſenſible *Emunctories* taken together. As a ſtrong labouring Man in conſtant Exerciſe, takes every Day, for Example, *eight Pounds* of Aliment, *three* of which, or at moſt *four*, he voids by *Stool* and *Urine*, and yet after the Digeſtion is finiſhed he weighs no more than before he had breakfaſted; hence it appears, that by Digeſtion the Aliments are attenuated ſo as partly to be converted into animal Spirits, and partly to fly off by Perſpiration. And the great Waſte even of the nutritive Particles ſometimes this Way, appears from the daily decaying of hectical Patients. In this Caſe therefore, as the Perſpiration was ſtopt from the *Epidermis* being obſtructed, there was no Need of Nouriſhment. On the other Hand, there was a Neceſſity for the Air's being received into the Lungs to recruit the animal Spirits, that it might be ſent out again, and thereby preſerved in Motion. And this ſame Air taken into the Lungs in Inſpiration, being there thickened, and turned into *Serum* in the Veſſels, afforded a Supply for the Urine during the Time of Abſtinence; as we frequently ſee *Hydropick* People increaſe in their Bulk from the Air only, that is, from the watery Particles contained in it.

An Examen of theſe Stones; *by Dr.* Fred. Slare. *Ib*, *p.* 103. *n.* 182. *p.* 140.

2. Two of theſe *Stones* being ſent to the *Royal Society* by Dr. *Sig. Konig* from *Bern*, in order to the better Inquiry into the Nature of this *Helvetian Concretion*, I made it my firſt Attempt to compare it with its *relative Pondus* to *Water*, having ſatisfied myſelf that there is a *Standard* of *Gravity* ſo competent to all real *Stones*, that where they decline from this *Standard*, we have good Reaſon to queſtion thoſe Concretions, whether they are *Stones* or no. The *Standard* of *Gravity* for real *Stones*, I find to be generally about 2 to 1 of *Water* and a little more. This Concretion was very hard, and ſeemingly heavy, but it was really very ſpongy; for when it lay under *Water*, there paſſed a good while before I could clear it of the lurking Bubbles, ſo that it grew heavier from time to time as the Bubbles were expelled, and at laſt arrived near the *Standard* of a true *ſtony* Concretion, or rather ſomewhat beyond it. It weighed in the Air 12 *Dr.* 36 *Gr.* In Water 6 *Dr.* 48 *Gr.* The Difference 5 *Dr.* 48 *Gr.* Therefore the Proportion betwixt this Concrete and Water proves to be as 217 to 100. This extraordinary *Pondus* gives Reaſon to ſuſpect, that there may be ſome metallick Ingredient in it.

Whilſt I was making theſe Trials, I was willing to compare this Matter with common *Chalk*, which I found *ſpecifically* lighter, bearing only the Proportion to Water of 180 to 100. Wherefore this Subſtance being ſo much heavier than *Chalk*, can ſcarce be thought a Concretion of ſuch a Matter.

I then compared it with *petrified Water*, being an Icicle that was broken off a *Grotto*, where a petrifying Spring did furniſh enough. A Piece of which, of 5 *Dr.* diſcovered its Weight to bear the Proportion of 219 to 100, to that of Water. Our anomalous Subſtance being ſo near the Weight of *petrified Water*, would almoſt incline a Man to believe it a real *Stone*, and the rather, becauſe we are informed the Patient drank much Water. Moreover, the following Experiments upon this Matter do ſeem to give Proof of its being rather of the ordinary ſtony Conſtitution, than of that which is proper to *Animal Concretions*. For Inſtance, we firſt of all poured upon it ordinary *Vinegar*, and it preſently wrought upon it with a hiſſing Noiſe, as it did on the *petrified Water* when powdered. We poured on it *Spirit* of *Vitriol*, and that alſo wrought upon it, and diſſolved it, but let it fall again, as *Aqua Fortis* does *Tin* when it has corroded it. *Spirit* of *Salt* wrought upon it very vigorouſly, and preſently diſſolved it, and kept it ſo without any *Precipitation*. Theſe Experiments do alſo diſtinguiſh this Concrete (whatever it be) from the ordinary *animal* ones, as the *Stone* in the *Bladder*, *Kidney*, the *Tophi*, &c. for theſe will not be diſſolved, or in the leaſt corroded by any of the mentioned *Acids*; though *Spirit* of *Nitre* be a general *Menſtruum*, that diſſolves them all readily. And there are ſome Things yet very ſtrange, which makes this Caſe peculiar; namely, that thoſe *Stones* which are generated in the Habit of the Body, I mean, in the very ſerous Part of the Blood, and thoſe that paſſed the *Bladder*, have juſt the ſame Nature with thoſe that are *extra Habitum*, even thoſe evacuated *ex Stomacho* and *ex Ano*; for one as well as the other will be preſently corroded by ſo mild an *Acid* as plain *Vinegar*.

The Relator, in his *Analyſis* of theſe *Stones*, gives an Account of ſo great a Quantity of *volatile* and *fixed Salt* obtained by his *Diſtillation*, that thoſe Trials do neceſſarily make it an *animal* Subſtance; but that Experiment ſo far failed us, that I am not ſatisfied as to the Matter of Fact: For that thoſe Concretions generated *extra Habitum*, in the *Stomach* and *Guts*, ſhould abound with *volatile Salt*, is ſtrange, for I have tried the *Bezoar Stone*, ſaid to be generated in the *Stomachs* of ſome *Animals*, and could obtain no *volatile Salts* from that Subſtance; though it herein agrees with this Subſtance, that it is eaſily wrought on by many *Acids*.

We may in ſome meaſure queſtion that Principle, or rather *Hypotheſis*, of *Acidum*, our Correſpondent truſts to, for the Combination or Coagulation of the Humours in the Body, in order to this *Petrefaction*, it being ſuppoſed, not proved. We may alſo queſtion whether the *fixed* or *alkalizate Salt*, found in the *Caput Mortuum* after *Diſtillation*, were really pre-exiſtent in that Form in the Blood, or other Humours, and not rather a Product of the Fire.

A further Trial; by Dr. Fred. Slare. *Ib. p.* 145.

3. We brought this *Stone* to a groſs Powder, and conveyed it into a coated *Retort*, which coated *Retort* was kept for ſome Hours in a naked Fire, ſo hot that the Glaſs melted. The Quantity we put into the *Retort* amounted to ½ *Ounce* and 20 *Grains*. The Liquor that came over ſeems ſcarce to afford 3 or 4 *Drops*, which looks like *Spirit* of *Harts-Horn* rectified, and ſmells much like the ſame; which plainly diſcovers it an *animal* Subſtance, though it affords much leſs than the *Calculus Humanus* does; and by Conſequence gives us a much larger Proportion of *Caput Mortuum*, or *Reſiduum*, in the *Retort*: All which is very conſentaneous to the Nature of the *Stone*, for its *ſpecifick Gravity* was much heavier than the *Stones* are we uſually find in the human Body; and therefore the Parts may be ſuppoſed more fixed, or to conſiſt of fewer volatile Parts, ſuch as are carried over by *Diſtillation*. We weighed the Remainder in the *Retort*, and it came to 3 *Dr*. and 50 *Gr*. 10 *Gr*. of which ſeemed to hang about the Neck of the *Retort* in the Form of a dirty hard-baked *Oil*. The other 20 *Gr*. are partly gone off in Vapour through the *Lute*, and what we find in the *Receiver* in a liquid Form.

We tried part of this *Caput Mortuum*, by applying Mr. *Haak*'s ſtrong *Magnet*, to enquire whether it contained any *Iron* Particles, but did not find any would adhere. But ſince Dr. *Liſter* has found them in much lighter *Concretions*, than thoſe of the *Kidneys* are; and many Bodies, though not *Ib. p.* 143. till after *Reverberation*, or a ſtrong *Calcination*, have detected an *Iron* Contexture; and even the *Marchaſite* itſelf, though very pregnant with *Iron*, ſhews it not, till it has been *calcined*; there remains yet one Trial to be *Ib. p.* 145. made, and that is to give it a much ſtronger *Reverberation* in the Fire, and then to ſee whether ſome Particles will not prove *martial*.

The Production *of* Stones *in* Animals; *by Dr.* Fred. Slare. *n* 157. *p.* 523.

XCI. 1. It is generally obſerved by thoſe that have been ſubject to the *Stone* in the *Bladder*, that Pains in the *Kidneys* were antecedent, which intimates the Foundation was firſt laid there, and afterwards by the *Ureters*, and a Guſh of *Urine* conveyed into the *Bladder*. The Manner of its Growth in the *Bladder* is obvious; the *Urine* (by ſome called *Lotion*) being too highly ſatiated or impregnated with a ponderous Matter (which we here deſign to examine) precipitates the ſame at certain times upon the mentioned Baſis, and alſo on the inward Superficies or Coat of the *Bladder*, which upon a Relaxation of their diſtended *Fibræ*, do ſtrictly embrace that preternatural Subſtance it finds there, as to overlay it or cloath it with whatever Sediment ſubſided there.

That the *Urine*, only at ſome Intervals, is diſpoſed to let fall this Matter, ſeems probable from this Obſervation, That the *Concrete* conſiſts of ſeveral ſpherical Superficies, or round *Incruſtations*, which, like ſo many diſtinct Shells, may be parted from each other. Moreover, theſe *Incruſtations* are obſerved to be very unequal, ſome much thicker than the other: An Argument that the *Urine* continued much longer diſpoſed to depoſe this *calculous* Matter at one time than at another; or elſe that it was much more ſatiated or abounded with this ponderous *Precipitate* at one time than at another, and ſo laid it over with a thicker *Cruſt* in as ſhort a Time.

If we examine the Cauſes that have been aſſigned to the *Production* of this *Concrete*, I think we cannot well grant *Heat* in the *Kidneys* to be a probable *efficient* Cauſe; a much more intenſe Heat than is poſſible to be found here, being neceſſary to make Bricks, or bake Sand and Earth into *Stone*. Nor is it neceſſary to derive the *material* Cauſe from ſuch a ſlimy and ropy, or *mucilaginous Indiſpoſition* of the *Humours*, that may perhaps coagulate and harden into a *Stone*; ſuch a *viſcous Urine* being leſs apt to precipitate this gritty Matter than more thin and limpid *Urine*. For I have found, in more than one, where the *Urine* has often been ſo ropy and ſtringy, that it would draw out into Threads upon the Application of a Stick; but yet we never diſcovered Symptoms of the *Stone* in the *Kidneys* or *Bladder* of ſuch Perſons. Nor do I believe that an *Acid* meeting with ſome *Alkalies* may be reaſonably concluded to conſtitute this ſo firm and ſolid a *Concrete*, ſince nothing that I know of but *Acids* will make the leaſt *Solution*. We may alſo except againſt the Experiment of *Coagulation*, upon the Mixtures of highly rectified *Spirit* of *Urine* and *Wine*, which, if warily managed, will make a *Coagulum* with ſuch Expedition as ſeems very ſtrange and ſurpriſing; for this *Concretion* will eaſily be diſſolved by Water. In like manner, if either of the *Spirits* be very *phlegmatick*, there will follow no *Coagulation*; inſomuch that the Humours of the *human* Body contain too much Water in them to admit ſuch an Effect, even in thoſe Conſtitutions that have uſed themſelves to very highly rectified *Spirits*. Moreover *Horſes*, *Dogs*, and other *Animals*, that drink no *Wine*, are not free from this gritty *Cementation*. Nor could I ever diſcover any Drop of *vinous Spirits* afforded upon our *Diſtillation* of this Matter. We may alſo queſtion the *Hypotheſis* of the Production of the *Stone* by *Petrefaction*. Stones are ſuch fixed Bodies, that they yield nothing upon *Diſtillation*, except a ſmall Quantity of inſipid Water chance to riſe; nor will they *exhale* very much in an open Fire; whereas we can *volatilize* 6 Parts of 8 of our *calculous Matter*, and obtain *Salts* and *Oils*.

The *Chymiſts* deſcribe the *Concretions* of the Body, and particularly this morbid one, by calling them *Tartareous*; who conclude they have ſufficiently accounted for the Nature of a Body, if they can but call it *Tartar*, which muſt be acknowledged to conſiſt of *acid* and *fixed Salts*, called *Alkalizate*, and of ſome *Terra Damnata*, though it be very little in Proportion to the other *Salts*. But there is little Reaſon to eclipſe its Nature by that Denomination, as appears by theſe following *Analyſes*. We *diſtilled* an Ounce of *Calculus Humanus*, that was recently cut out of a Body, which afforded about 2 *Dr.* of a brown *Spirit*, nearer to that of *Harts-Horn* than *Urine*. We put the *Caput Mortuum* upon the *Cuppel*, and reduced it to near a *Dram*; the reſt burning and ſmoaking away. Another time, we *diſtilled* in a naked Fire a *Stone* that weighed 2 *Ounces*; the Vapour came over upon a good Streſs of Fire, and ſettled in the Form of *Salt*, without any Liquor, of which we preſerved only a *Dram*; it appeared very brown, and taſted bitter, as the *fœtid Oil* of *Harts-Horn* and other *empyreumatical Oils* do. We examined by *boiling* and *evaporating* Water from the *Caput Mortuum*, whether it held any *fixed Salt*, but found none. The *Caput Mortuum* weighed 1 *Ounce* and 6 *Dr.* ſo that it loſt only 2 *Dr.* in the *Diſtillation*; that is, only 2 *Dr.* came over the *Helm*. We proceeded farther, and placed this *Caput Mortuum* upon a *Teſt* in an open Fire, where it burnt away to 2 *Dr.* 44 *Gr.* This we alſo *boiled* in Water, to ſee what *Salt* it held; but it ſcarce afforded a Taſte of *Salt*, ſcarce ſurmounting that we uſually find in the like Quantity of common Water. In this *fiery Trial*, an *Ounce* and 3 *Dr.* of the 2 *Ounces*, *evaporated* in the open Fire (a material Circumſtance which *Chymiſts* rarely enquire after) of which we have no Account. I endeavoured to ſave ſome of it, by placing a taper Chimney or Tunnel to receive the Smoak, as the Fire and a Pair of Bellows raiſed it, which ſo far ſucceeded, that I catched above 2 *Dr.* of this fuliginous Subſtance, and ſome Drops of a *Water* of a fœtid *ſaline Taſte*. The Smoak of our common Fires gives us a *Sublimate*, whoſe *Chymical* Principles are no leſs conſiderable than the Bodies from whence they aſcend; for I lately found them not only to contain *volatile Salts*, *Oils*, and *Phlegm*, with other things, but even a *Salt* ſo near to common *Sea-Salt*, that it ſhot into cubic Figures, much like to that we have obtained in *Analyſis* of *human Urine*. But, becauſe it may be objected, that that *Salt* might probably be nothing elſe but the common culinary *Salt* we conſtantly take in with our Food, I *diſtilled* the *Urine* of *Horſes*, that were fed with Hay and Oats, and have obtained the ſame ſort of *Salt*.

If we now compare this *Concrete* with *Tartar*, we find the one a *vegetable Salt*, wholly diſſolvable in Water; the other ſo ſtubborn, that ſeveral very corroſive *Menſtruums*, that will eaſily diſſolve Iron, and Copper, and Silver, and almoſt any thing, will not make any Impreſſion here. The one affords a little *volatile Salt*, which is *alcalizate*, and no *fixed Salt*; the one affords much more earthy Subſtance, called *Terra Damnata*, than the Hoofs or Horns of Animals, *&c.* and the other leaves us ſcarce any: One abounds with an *acid Salt*, which is ſenſible to the Palate, and very manifeſt in the *Spirit* of *Tartar*; but in the other we could diſcover none upon the narroweſt Search.

The Notion of preſuming this *calculous* Matter *tartareous*, has put Men upon uſing Medicines to deſtroy *tartareous* Concretions, as well as avoid many Things that ſeem to have *Tartar* in them; and yet at the ſame time, perhaps, it may be as inoffenſive as ſome of thoſe Medicines that are ſubſtituted, at leaſt, as *Spirit* of *Salt*, or *common Salt*, commended by *Helmont*. In like manner the Notion of *Petrifaction* (which ſeems from whence the *Stone* derives its Name) may be no leſs erroneous; there being no Agreement or Analogy in their Natures, whether we conſider them *ſynthetically* or *analytically*. If we conſider Stones *in Compoſito*, there is a particular Weight or Gravity belonging to their Bulk, in which they *ſpecifically* agree. Several Sorts I have weighed according to the *hydroſtatical* Laws, and I find them agree in being twice as heavy as their Bulk of Water, and about a fourth Part more. This I found true in *Wood*, *Bone*, and *Shells*, when *petrified*, and even Water it ſelf, and ſome other Bodies, though never ſo light in their former State, as ſoon as they have obtained the Form of Stone, they all become of the mentioned Weight, or very near it. But this, which is called the *Stone* of the *Bladder*, is much lighter, and ſeveral of them agree in being only as heavy as their Bulk of Water, and a fourth Part more. This yields to none but the moſt potent *Acids*, and particularly to *nitrous* ones alone, the other is diſſolved by almoſt any ſlight *Corroſive*. The one in our *Analyſis* affords various conſtituent Parts; and the other, upon *Diſtillation*, only a Drop or two of inſipid Water, the reſt remaining fixed.

But this *Concrete* may perhaps owe its *Origin* to a very ſoft and thin Fluid, more remotely to the *Chyle*, ſtrained through the *Guts*; and yet nearer the Matter, to the *Blood* itſelf; but neareſt and immediately to the *Serum* of the *Blood*, which ſeems to be its proper *Vehicle*. And we ſhall be leſs ſurprized to derive ſuch firm and ſolid Productions from Fluids, when we conſider that there are Particles floating in the *Blood*, always diſpoſed to be converted into *Griſtles*, or to make up the ſolid *Skull*, *Nails*, *Bones*, &c. and that even the *Teeth*, whoſe Texture is very firm, are made and ſupplied out of the ſoft Fluids of the Body. Even ſome of theſe ſolid Parts of the Body may, by a *Diſeaſe* of the Blood, be abraded, and abſorbed by the common Fluid, and precipitated by their own

Weight upon the *Pelvis*, or elſe ſtick in the *Tubules* of the *Kidneys*, and ſo choak them up, and by degrees extend them to Rupture, or grind them to Pieces by a conſtant Impulſe of this gritty Subſtance, which may at laſt convert the greateſt Part of the *Kidneys* into this firm *Concrete*. Moreover, without any Reſpect had to theſe ſolid Abraſions, the Blood itſelf (of which the *Serum* is a great Part, and with which it is intimately mixed) conſiſts of heterogeneous Particles, of ſo various Forms, Sizes and Shapes, which ſeems neceſſary for their accommodating themſelves to all Parts, that even theſe deſigned to conſtitute the ſolid Parts, may ſuffer ſuch irregular Changes in the Body, which may unfit them to paſs the *emulgent Vein*, and ſo to continue their *Circulation*: Inſomuch, that the continued *Impulſe* of this Matter by the *Artery*, may make very conſiderable Aggregates or *Concretions* in the *Kidneys*: And not only ſo, but without either reſpect to *Vein* or *Artery*, the *ſerous* or watry Part of the Blood, which we ſaid before was the *Vehicle* of the *Stone*, may have imbibed ſuch heterogeneous, groſs and ponderous Particles, as may, whilſt in Motion and Agitation through the *Veins* and *Arteries*, fluctuate and mix well enough together, but may very eaſily ſeparate upon the leaſt *Stagnation*. Thus the various Mixtures in a *Torrent* ſeem to make up one homogeneous Fluid; but if ſome Part of this Fluid happen to fall into a Pit, or *ſtagnate* in a quiet Place, we ſhall find it clear itſelf of *Sand*, *Mud*, and other differing Parts.

That the *Nature* of this *Concrete* ſeems rather referable to *Bone*, than to any other conſiſtent or fluid Part of the Body, I concluded, by comparing their *chymical* Products. Having cleared the *Bone* of *Marrow* and *Fat*, by boiling it in Water, I *diſtilled* it, and obtained about 2 *Drams* and an half from an *Ounce* of *Bone*, of a *volatile* Liquor impregnated with *Salt*, that ſmelt very much like that I have mentioned; which was very differing from Spirit of *Urine*, and nearer that of *Harts-horn*: I found the *Caput Mortuum*, as to Weight, very conſonant; and alſo could extract no manner of *Salt* from it. For which Reaſon *Refiners* make their *Cuppels* of *calcined Bones*, they being forced to *dulcify* (which they call waſhing out the *Salts* of) other *Aſhes*, before they can make *Cuppels* of them. Laſt of all, it herein alſo agrees with the *Calculus Humanus*, vulgarly ſo termed, that few *Acids* will diſſolve it, excepting thoſe that are *nitrous*, nor do theſe work on it very vigorouſly. But herein they muſt be allowed to differ in their *ſpecifick Gravity*; the *Calculus* not having ſo cloſe and compact a Texture as the *Bones* have. For *Bones* I have found twice as heavy as their Bulk of Water.

Several Comparative Experiments made upon Stones, *and other things. Ib. p.* 532.

Several *Stones* of the *Bladder* and *Kidneys* were *diſtilled*, and all afforded *volatile urinons Salts*, which *ferment* upon any *Acids*; *Bones* were *diſtilled* and found to be of agreeable Principles: *Petrified Water* affords only freſh and clear Water upon *Diſtillation*.

Calculi examined *hydroſtatically*, were found, in Proportion to their Bulk of Water, as 5 to 4; *Flint*, *Chryſtal*, *Petrified-Water*, *Welſh-Diamonds*, *Petrified-Wood*, almoſt as heavy again as our *calculous* Matter; and *Bones* twice as heavy as Water.

Bones were not eaſily wrought on by common *Acids*, only by *nitrous* ones, and that without *Ebullition.* And various unſucceſsful Attempts were made to diſſolve the *Calculus* by *acid* and *acrimonious Menſtruums*, whereof ſome were *Vegetable*, and ſome *Mineral*; as *Spirit* of *Salt*, of *Vinegar*, of *Venus*, *Oil* of *Vitriol*, &c. alſo with *Alkalizate Acria*, as *Sal Fraxini* (which corrodes Glaſs) *Lapis Infernalis*; but none would touch it except *Nitrous.*

The Generation of the Stone; *by Dr.* Tho. Molineux, *n.* 202. *p.* 818.

2. The different *Texture* of Parts in one and the ſame *Stone*, obſervable in moſt of this Kind, if they be of large Size, proceeds, I am apt to think, from the ſame conſtant Bed or ſettled *Poſture* of the *Stone* in the *Bladder*, whereby ſome Parts of it are more expoſed to imbibe the Moiſture of the *Urine*, as it falls or ſettles in the *Bladder*, than others; and by this Sort of *Maceration* are kept ſoft; whilſt thoſe Parts that lie higher, towards the upper Region of the *Bladder*, remain dry, harden, and gather a ſort of gritty Cruſt; as we find moſt ſoft Stones do, that are dug out of the moiſt Earth, when expoſed a while to the dry Air.

It ſeems to me very probable, that *Stones*, when they come to be of a large Size, keep much one and the ſame *Poſture* in the *Bladder* at all Times, there not being room in ſo pliant and membraneous a Body, that always contracts itſelf to the leaſt Dimenſions it can, to allow a *Stone* of any conſiderable Bulk (for the Caſe is different in thoſe that are ſmall) to tumble or change its *Situation* very much.

Vid. Supr. Sect. LXVI. *Fig.* 39.

But however this Conjecture may prove true or falſe, it is undeniable, that ſome *Stones*, from their Way of Generation, muſt of Neceſſity remain fixed and immoveable in the *Bladder*; being cloſely joined and united to the very Subſtance of its Membrane: Of which Sort there are ſeveral Examples recorded by *Schenkius* and other Collectors of Obſervations. And I am perſwaded, that that *Stone* which I deſcribed above, may be reckoned amongſt them: For about the larger End, where it is marked *d d d*, there ſtill cloſely adhere ſeveral thin Films and *carneous Filaments*, which manifeſtly ſhew it was formerly united by this Part to the membraneous Subſtance of the *Bladder*, and that lately by its own Weight, or ſome other Accident, it was torn away, and fell into the *Urethra*, through which it was *voided*; and hence it was that this Woman, as ſhe herſelf told me, never ſuſpected herſelf, till very lately, at all troubled with the *Stone.*

Stones *extracted from Women, without* Cutting; *by Dr.* Tho. Molineux. *n.* 202. *p.* 817.

XCII. Amongſt the two vaſt Collections of *Stones*, that amount at leaſt to ſeveral Thouſands, kept together in the Hoſpitals at *Paris*, *L'Hotel Dieu* and *La Charité*, not one in a Hundred is taken out of a Woman. This muſt certainly proceed from the *Urinary Paſſage* in this Sex being ſhorter, larger, and more apt to dilate, than that in Men; ſo that for the moſt Part, when Gravel, or a ſort of viſcous claiy Matter, which I take to be the chief Cauſe of the *Generation* of the *Stone*, falls into the *Bladder*, it is ſuddenly and eaſily diſcharged, e'er it can cohere together, and form a *Stone* of any large Bulk; which cannot ſo frequently happen in Men, by reaſon of the Narrowneſs, Crookedneſs and Length of the Paſſage of the *Urethra.*

However, it ſometimes comes to paſs, that even in Women, either from
a more depending, or leſs elevated Poſture than uſual in their *Bladder*; or
that the Matter forming the *Stone* adheres to ſome Part of its Membranes, ſo
that it cannot fall into the *Urinary Paſſage* till its own Bigneſs or Gravity
forceth it thither, *Stones* of a very conſiderable Bulk are generated. But the
many Inſtances we meet with of vaſt *Stones* ſpontaneouſly *voided*, are ſo many
Ib. p. 820. Arguments from whence, I think, one may reaſonably infer, that no Woman
need to be obliged ever to undergo the painful and hazardous *Section* of the
Stone. For ſince Nature, by her own Power, without the Aſſiſtance of any
Help or Remedies, can diſburthen herſelf, and force away ſuch large *Stones*
Vid. Sup. as thoſe deſcribed by ſeveral Authors, we may probably conclude, that
even thoſe ſtill larger (if there be any ſuch bred in Women) may be brought
away, by putting the Body into a convenient Poſture, and ſo by the Hand
and Fingers forcing the *Stone* into the *Urinary Paſſage*, which by Application
of relaxing and ſtrongly emollient Remedies, may be ſo dilated, as to
give a free Paſſage to the *Stone*, without any forcible *Section*.

Ib. p. 821. The Practicableneſs of this Method hath been ſucceſsfully demonſtrated
by Mr. *Thomas Proby*, an ingenious *Chirurgion* of *Dublin*, in three Inſtances of Fact.

1. The firſt Inſtance was *Sarah Cook*, a Child about 6 Years old, who
for ſome Years had been ſo miſerably afflicted with the *Stone*, and a perpetual
Incontinency of her *Urine*, that her Parents, at any Hazard, were willing
to attempt relieving her of ſo violent a Pain, and ſo foul a Diſtemper.
Whereupon, *June* 8, 1693, the Child being placed in a convenient Poſture
in a Man's Lap ſitting acroſs a Table, with her Arms tied down to her Legs
by a Sort of Bandage uſual in theſe Caſes, the *Chirurgion* firſt paſſed his *Catheter*
into the *Neck* of the *Bladder*, that it might empty itſelf of all *Urine*,
before he inſerted his *dilatory* Inſtrument, or his *Speculum Veſicæ*, as one
may call it, with which he extended the *Urethra* as much as poſſible he
might with Safety, and without putting the Child to extraordinary Pain:
Afterwards, by Help of a *Directory* and *Forceps* gently thruſt into the *Bladder*,
Fig. 44. he brought away the *Stones*, without any manner of *Inciſion*, in about 3 or 4
Minutes Time from the paſſing in of his Inſtrument, and put the Patient
to ſo little Pain during the *Operation*, that when it was over, and ſhe laid
quietly a-bed, ſhe ſlept, without any *Opiate*, 7 or 8 Hours together, as ſhe
had not done many Months before; and was in a ſhort Time perfectly
well and at eaſe.

2. The ſecond Inſtance was *Eliz. Mortimer*, about 10 Years of Age,
who had been troubled with an *involuntary* diſtilling of her *Urine*, and
other painful Symptoms of the *Stone*, for theſe 3 or 4 Years paſt; but on
Fig. 45. *June* 12, 1693, ſhe was happily relieved by the *Extraction* of a large *Stone*,
near as big as a Pigeon's Egg, after the ſame Manner and Method as before
deſcribed, and with as good Succeſs, though not altogether with as quick
Expedition.

n. 236. *p.* 11. 3. I have been ſtill more confirmed in my Opinion of the Reaſonableneſs
of this Method, by ſeveral other ſucceſsful *Operations* I have ſeen of the like

Kind; but more particularly, by one lately performed in *Dublin* on *Sarah Jones*, a Girl between 11 and 12 Years of Age, that for 6 Years had been ſeverely afflicted with all the painful and uſual Symptoms of the *Stone:* But *Oct.* 16, 1697, ſhe was happily relieved, by only *dilating* gently the *Neck* of the *Bladder*, and then *extracting* a *Stone* of a very conſiderable Bulk, without making any *Inciſion* at all. The whole Operation was performed in 6 or 7 Minutes.

Fig. 46. By the extraordinary large Size of this *Stone*, it may ſeem almoſt incredible, that a Solid of that Bulk ſhould be forced through the *Urethra* of ſo ſmall and ſo young a Child, without any manner of *Section*; and that the Child ſhould recover ſo as to be perfectly well, without the leaſt ill Accident ſucceeding the *Operation.* But we may gather hence, of what vaſt Extenſion this *Urinary Paſſage*, though naturally ſtrait, is capable; and how much ſtill wider it may be dilated where it is proportionably larger, I mean of thoſe of this Sex of riper Years, or grown up to Woman's Eſtate; who may yet more eaſily and ſafely be relieved after this Manner, even of *Stones* of a much larger Size than this we here ſpeak of.

The *French*, a Nation certainly very ſubject to the *Stone* in the *Bladder*, and whoſe *Chirurgions* therefore muſt of Neceſſity be very converſant with this Diſeaſe, and expert in the *Operations* requiſite for the Cure of it, have, I ſee, lately eſtabliſhed this Sort of Practice; though I muſt needs own I did not know ſo much till I had peruſed a very uſeful Book of Chirurgery, publiſhed but this laſt Year, 1696, at *Paris* in 8*vo.* by M. *de la Vauguion*; entituled, *Traitè Complet des Operations de Chirurgie.* And I cannot but recommend it to the ſkilful *Chirurgion* as an *Operation* fit for general Uſe in theſe Caſes, being both ſafe, and eaſily practicable, and alſo of great Benefit and Relief to no leſs than the Moiety of Mankind, whenever they are afflicted with this painful Diſeaſe. And to ſay truly, if Women in this Caſe would but timely ſeek for Help, before the *Stone* be too much grown, they might with far leſs Danger and Pain be relieved of this torturing and laſting Evil, than they are delivered of a common *Natural Birth.* But if at any time a *Stone* *n.* 202. *p.* 823. be found of ſo large a Bulk as not to admit this Sort of *Operation*, then the *Section*, if the *Chirurgion* be ſo bold as to venture on it, muſt be made ſo *wide*, as wholly to *cut* through the ſhort *Neck* of the *Bladder*, and to divide likewiſe ſome Part of its thin *membranous* Subſtance, which is known *n.* 236. *p.* 15. to be of the moſt dangerous Conſequence in *cutting* the *Stone*, and to be avoided as certain Death to the Patient; according to that Aphoriſm of *Hippocrates*, *Cui Secta eſt* Veſica, *Lethale eſt.* However, I have Reaſon to think the Inſtances of this Kind will be very rarely met with: For Experience juſtifies what I have obſerved above, that Women are not capable by Nature of Breeding *Stones* in their *Bladders* of ſo big a Size as Men frequently do; which is moſt apparent from thoſe many Hiſtories of ſtupendious large *Stones* regiſtered by Authors, amongſt which the largeſt I have heard of bred in a *Woman*'s *Bladder*, was not $\frac{1}{3}$ part of what has been produced of this Kind in a *Man*'s.

A large Stone *cut from a* Woman; *by Mr.* Baſil Wood. *n.* 209. *p.* 103.

XCIII. *Nov.* 8, 1693, a large *Stone* was taken from Mrs. *Henchman*, a Widow Gentlewoman, of the Age of about 51 Years. Its Shape is not very unlike to a ſort of Spring-purſe (as they are called) which many People uſe; and its Surface is indifferently ſmooth, excepting only that there are 4 Protuberances, each of which is about the Size of a Hazle-Nut: Theſe ſeem to have been at firſt leſſer *Stones*, which falling into the *Bladder* after that the great *Stone* was almoſt grown to its full Bigneſs, they were joined to it, firſt by Adheſion, and at laſt became all one Body with it. It is alſo very probable, that the leſſer End of the great *Stone*, was once a diſtinct *Stone*, and fell into, or was ſeparately formed in the *Bladder* a good while after that the bigger Part had taken Poſſeſſion there. The Length of the *Stone* is $3\frac{3}{4}$ Inches. Its Breadth, where largeſt, is very near $3\frac{1}{4}$ Inches. Its Thickneſs $1\frac{7}{8}$ Inch. Its Weight is 9 Ounces and a half *Avoirdupoiſe*.

Dr. *Molineux* (that learned Phyſician of *Dublin*) has mentioned two or three Notions which I ſuppoſe this *Operation* does confute.

Vid. Sect. LXVI. *and* XCII.

1. He thinks that *Women* never breed *Stones* ſo large as *Men*; the contrary of which ſeems to be manifeſt by this *Operation:* For perhaps a *Stone* of ſo large a Size as this, was never yet taken out of the *Bladder* of a living Man.

2. He ſeems to conclude it probable that all *Women* may be freed from the *Stone* by Dilatation of the *urinary Paſſage*, and then forcing away the *Stone* through it: Which Method I think cannot be depended upon, ſince the *Stones* may prove of ſo great a Size.

3. He ſays, That dividing the membranous Subſtance of the *Bladder*, is to be avoided as certain Death to the Patient; whereas this *Stone*, and many others, have proved too large to be extracted through an Inciſion made only within the ſhort *Neck* of a *Woman*'s *Bladder*.

The Patient never had the leaſt ill Symptom ſince her being *cut*, and is now perfectly well.

A new Way of Cutting *for the* Stone, *by a* Hermit *in* France; *by M.* Buſſiere. *n.* 250. *p.* 100.

XCIV. Brother *James*, an *Hermit* in *France*, in his *Extraction* of the *Stone* out of the *Bladder*, maketh Uſe of a Steel *Staff*, much bigger and ſhorter than thoſe which are commonly made uſe of: It is ſhorter from the Top to the Bending of it, and it bends more than ours. He hath but two, one for Men, and another for Children. His *Conductor* is ſlenderer and longer than ours; the Point whereof, which goes into the *Bladder*, being of the Figure of a Lozenge, is wide and open in its Extremity. His *Forceps* have longer Branches than ours; but the Holds of them are ſhorter and wider, with many large Teeth within. The *Eurethra*, with which he draweth the Sand or Gravel, which remain ſometimes in the *Bladder* after the *Stone* is out, is ſhorter than ours. His *Knife* is much longer and ſlenderer than ours.

He cauſeth the Patient to lie flat upon his Back, either upon his Bed, or upon a Table, whereon is a ſoft Quilt, in ſuch a manner, that the *Fundament* is 3 or 4 Fingers over the Table, ſome Servants ſupporting his Thighs and Legs. He uſeth no Ligature, but only cauſeth his Legs to be bent againſt the Thighs, but not the Thighs againſt the Belly, except the Left, which in his *Operation* he uſeth more or leſs, as he thinks fit. Then he introduceth the *Catheter* or *Staff* into the *Bladder*; which though bigger and ſhorter than ours, yet ſeemeth to run in eaſier: Very often he holdeth it himſelf with his Left Hand, preſſing it cloſe toward the *Fundament*, in order to dilate and extend the Membranes of the *Bladder*. Then he feeleth with the Fingers of his Right Hand, to find out the *Staff* through the Skin; ſo having felt it, he runneth his *Inciſion-Knife* at the Bent of the Left Thigh, upon the fat Protuberancy below the *Iſchium* Bone, directly upward, by the *Rectum* to the *Bladder*, which he pierceth by its Neck, and ſometimes a little above it: When he *cutteth*, the cutting Parts of his *Knife* are turned upward and downward. Having thus pierced the *Bladder* which he knoweth when the *Urine* runneth out; then he turneth his *Knife*, and thruſteth it a little further, in order to open the *Bladder* wide enough, that his Finger may go in eaſily. Then he withdraweth his *Knife*, and enlargeth the Wound in the outward Parts, of the Length of 2 or 3 Inches; after which he thruſteth his Finger into the *Bladder*, in order to know more preciſely the Bigneſs and Situation of the *Stone*, and make it looſe; but chiefly to dilate the Overture of the *Bladder*, by tearing its Membranes. Then he introduceth his *Conductor* into the *Bladder*, along his Finger which is in it. When the *Conductor* is in the *Bladder*, he taketh the *Staff* out, and introduceth the *Forceps* by the *Conductor* into it, with which he gets hold of the *Stone*, and draweth it out. If he find any Difficulty either in getting hold of the *Stone*, or in drawing it out, he uſeth all the Ways commonly uſed, raiſing the Left Thigh more or leſs, putting his Finger into the *Fundament*, and ſometimes into the *Bladder*, to looſen it, in caſe there be any Adheſion with the Membranes. Having found out and removed the Cauſe of the Difficulty, he thruſteth the *Forceps* again into the *Bladder*, and gets hold of the *Stone*, and pulls it out.

It is to be obſerved, That this ſecond Time, nor any other, he uſeth no *Conductor*, the *Forceps* running in very eaſily. He never thruſteth either his Finger or any Inſtrument into the *Bladder*, without ſteeping them in *Oil* of *Roſes*. He never uſeth any *Dilatorium*, or *Cannula*, or Tents, in the Wound, except ſometimes ſmall Doſſils in the Lips of the outward Wound, to keep them open for a little while. He only applies a Pledget, ſteeped in *Oil* of *Roſes*, upon the Wound. He operateth this Way as dexterouſly as any of our beſt *Operators*. Very often he *cutteth* the Patient upon the *Gripe* almoſt in the ſame Manner as was uſed formerly, except that he maketh the *Inciſion* in the ſame Place as for the former: This Way he liketh better than the other, and it ſeemeth to be more favoured by him; and indeed it is ſurer, though the Preſſing upon the *Belly*, which he doth, is a very bad Method.

He *cutteth Women* alſo upon the *Staff*, and in the ſame Place as Men. He did perform this *Operation* in my Preſence upon three; one whereof was but a Girl of 11 Years old; which maketh me believe, that he uſeth the ſame Way in all, though in them he did cut the internal Neck of the *Uterus*.

But in my Opinion, that Way (either in *Men* or in *Women*) is not ſo ſure as the antient, by reaſon that the Point of his *Knife*, not being directed by the *Staff*, he is always in danger of piercing all the Membranes of the *Bladder* through and through; and beſides, the Place whereupon he maketh the *Inciſion* being full of conſiderable Veſſels, one can hardly avoid the cutting ſome of them. We have obſerved in almoſt all that died in his Hands, that there was a great deal of *Blood* in the *Bladder*, and ſome in the Cavity of the *Abdomen*. He ſucceedeth better when the *Stone* is big and large, than when it is ſmall; by reaſon that a big *Stone* not only extendeth the *Bladder*, but it ſtoppeth the Point of the *Knife*. He did refuſe to cut one, in whoſe *Bladder* there was but a ſmall *Stone*; which confirmeth me in the Opinion, that the Unſucceſsfulneſs of his *Operations* proceedeth from the Point of his *Knife* not being ſtopped neither by the *Staff* nor *Stone*; for when there is but a ſmall *Stone*, the *Bladder* being empty, he muſt neceſſarily cut the whole *Bladder* throughly, and conſequently cut ſome of its own Veſſels, which cauſeth the *Hemorrhage*, which is the better avoided when the *Stone* is very large.

Obſervations and Experiments concerning this Way of Operation. *Ib. p.* 104.

The Obſervations I have made about this Way of *Operation* are theſe: I took a Body, in the *Bladder* of which I put a *Stone*; the *Staff* being in the *Bladder*, I did preſs it downward, hard enough to be felt through the *Teguments*, and made the Inciſion upon it in the Bent of the Thigh, in order to know whether it would not be a ſurer Way, by ſecuring the Point of the *Knife*: By that Way I got my *Conductor* and *Forceps* into the *Bladder*, and drew the *Stone* very eaſily; but afterward, by the *Diſſection* of the Body, I found that the Artery of the *Penis*, and the *Veſiculæ Seminales* were cut through and through, which cannot be avoided, becauſe the *Artery* and *Veſiculæ* lie immediately under that Part of the *Bladder* which the *Staff* preſſeth upon.

I took another Body, and having in the *Bladder* a ſmall *Stone*, I made the Inciſion much lower, and pierced the *Bladder* under the *Staff*, by which *Inciſion* I drew the *Stone*: Then *diſſecting* the Body, I found the *Bladder* cut through, and its *Arteries*, which can hardly be avoided, the *Bladder* being there ſo much contracted, that both Sides of the *Bladder* are cut before the *Operator* either feels the *Stone*, or ſees any *Urine* running out.

I took a third Body, in the *Bladder* of which I put a very large *Stone*; the *Staff* being in it, I made the *Inciſion* upon the fat Protuberancy, under the *Iſchium* Bone, and piercing the *Bladder* below the *Staff*, I found immediately the *Stone* with the Point of the *Knife*, with which I cut the *Bladder* the Length of an Inch: Through which having introduced the *Conductor*, and then the *Forceps*, I got hold of the *Stone*, and drew it out very eaſily. Then I did *diſſect* the Body; and found that neither the *Veſiculæ Seminales*, nor any *Artery* had been cut; by reaſon that the Weight of the *Stone* preſſed the Bottom of the *Bladder* lower than the *Veſiculæ* and *Arteries*.

My Opinion is then, That this Way might be made Uſe of when the *Stone* is very big, and willingly I would prefer it to the old Way; for by this Way we avoid that extraordinary and violent *Dilatation* of the *Neck* of the *Bladder*, which the *Stone* cauſeth when it is very big, and which is the Cauſe of the Inflammation and Mortification of the *Bladder* that killeth the Patient: But when the *Stone* is ſmall, or of but an indifferent Bigneſs, the old Way is eaſier and ſurer. But I cannot approve of this Way at all, on *Women*; ſince one cannot avoid cutting the *Neck* of the *Uterus*, the *Cicatrix* of which might prove to be of ſome ill Conſequence, in caſe the *Woman* ſhould come to be with *Child*: And therefore in *Women*, when the *Stone* is but indifferent big, the old Way is preferable to any other. But if it was very big, then I had rather to thruſt my Fingers into the *Vagina*, and bring the Stone as near the *Neck* of the *Bladder* as can be, and cut the Membranes of the *Vagina* and *Bladder* upon the *Stone*. I cut a *Woman* in *Hambourgh* by that Way, from whom I drew a *Stone*, weighing 5 Ounces and a half, who recovered very well. By this Way we prevent the *Incontinency* of *Urine*, which followeth always the *Extraction* of great Stones in *Women*.

I cannot approve, neither, the *Cutting* upon the *Gripe*, as it is practiſed by ſome *Mountebanks*; becauſe in that Way one cutteth through the *Proſtates*, which deſtroyeth the *Parts* of *Generation*. I have obſerved, that all thoſe which have been cut by that Method, were never fit for *Generation*.

The Way of cutting *for the* Stone *in the* Kidney; *by Mr.* Charles Bernard. *n.* 223. *p.* 333.

XCV. Mr. *Hobſon*, who was *Conſul* for the *Engliſh* at *Venice*, having been long afflicted with the *Stone* in the *Kidney*, was at length attacked with a Fit of that Duration and Violence, that it reduced him almoſt to Deſperation; and finding no Relief from any Means that had been uſed, and being under the greateſt Extremity of Pain imaginable, he addreſſed himſelf to *Dominicus de Marchettis*, a famed and experienced Phyſician at *Padua*, imploring of him, that he would be pleaſed to cut the *Stone* out of his *Kidney*, being fixed in his Belief that no other Method remained capable of relieving him; adding, that he was not inſenſible of the Danger, but that Death itſelf was infinitely more eligible than a Life in that Miſery, under which he had long, and did then groan. *Marchetti* ſeemed very deſirous to have declined it, repreſenting not only the extream Hazard, but as he feared the Impracticableneſs of the *Operation*, that it was what he had never attempted, and that to proceed to it, was in effect to deſtroy him. But Mr. *Hobſon* perſiſting, that if he refuſed it, he would never deſiſt till he found out one who would do it, *Marchetti* was at length, by his Reſolution and Importunity, prevailed upon to undertake it: And having prepared him as he thought convenient, he began with his Knife, *cutting* gradually upon the Region of the *Kidney* affected, ſo long till the Blood diſturbed and blinded his Work, ſo that he could not finiſh it at that Attempt. Wherefore dreſſing up the Wound till the next Day, he then repeated and accompliſhed it, by *cutting* into the Body of the *Kidney*; and taking thence two or three ſmall *Stones*, he dreſſed it up again. From this Inſtant he was freed from the Severity of his Pain, and in a reaſonable Time was able to walk about his Chamber, having been in no Danger either from Flux of Blood or Fever. *Marchetti* continued to dreſs the Wound for a conſiderable Time, but was not able to cloſe it up, it ſoon becoming *fiſtulous* from the continual flowing of the *Urine* through the *Sinus*; but being in all other reſpects reſtored to his former Health and Vigour, and the Matter diſcharged being little, he took leave of the Profeſſor, and returned to *Venice*, under the Care and Management of his Wife; who, one Morning, as ſhe was dreſſing the Sore, fancied ſhe felt ſomething hard and rugged as ſhe wiped it; upon which, examining a little more carefully with her Bodkin, which ſerved her inſtead of a *Probe*, ſhe found it to be a *Stone*, of the Figure and Magnitude of a *Date-ſtone*; which being removed, he never after complained of the leaſt Uneaſineſs in that Part.

About 10 Years after this he returned to *London*, where the learned Dr. *Tyſon* and myſelf were, by Dr. *Downs*, who had known him formerly in *Venice*, invited to ſee him. And after we had received this Account from himſelf, he gave us the Satisfaction of viewing the Sore, which continued open, and permitted me, without any Complaint (the *Calloſity* being great) to paſs my *Probe* ſo far into the *Sinus*, that we concluded it reached into the *Kidney*. The Matter it then diſcharged was but little in Quantity, but always diluted with, and ſmelt ſtrong of *Urine*. The *Orifice* would ſometimes cloſe for 3 or 4 Days together, and then the Matter made its Way through the common Paſſages with the *Urine*, yet without any Difficulty or Pain. There is no queſtion, but that there was a Coalition of the *Kidney* and the Muſcle *Pſoas*. When we ſaw it, he applied nothing to the Orifice but a clean linnen Rag, which had a ſtrong *urinous* Scent. He was then as able, in Appearance, to perform all the Functions of Life, and to undergo any Fatigue, as any Man of his Years; being then, I conceive, upwards of 50, and was the next Day to ride Poſt 40 or 50 Miles.

This, I think, is the firſt Experiment of this Kind. Some Authors indeed have imagined that *Hippocrates* hath commanded the *Operation*, when enumerating the Diſeaſes of the *Kidneys*, and their Cure, he ſaith, *Quum autem intumuerit & elevatus fuerit, ſub id tempus juxta* Renem Secato, *& extracto pure*, Arenam *per* Urinam *cienti*, *ſanato*. *Si enim* Sectus *fuerit*, *Fugæ ſpes eſt*, *ſin minus*, *Morbus Homini commoritur*. And *Sinibaldus* in particular, upon theſe Words paſſionately exhorts the *French* and *Roman* Chirurgions to make the Experiment upon Brutes, that they might with greater Dexterity and Readineſs perform it upon Men. But, with Submiſſion, he ſeems to infer more from theſe Words of *Hippocrates* than they can bear: For it is not ſufficient (according to theſe Directions of *Hippocrates*) that we take our Indications from the common Symptoms of the *Stone*, be they never ſo grievous, and never ſo evident; but there muſt be an *Apoſtem*, and that too is to manifeſt itſelf externally by a *Tumour*. And then, indeed, the Neceſſity and Reaſon of the *Operation* are ſo obvious, and the Difficulty ſo little, that no Man ought to decline it. Nor do we want Inſtances of *Apoſtems* in the *Kidneys*, occaſioned originally from the *Stone* there, and manifeſting themſelves by a *Tumour*, upon opening of which, *Stones* have been diſcharged with the *Pus*, or have been ſoon after removed; and this is the very Caſe

De Intern. Affect.
Antiph. Hippocr.4.*Lib.*V.

Caſe which *Hippocrates* ſuppoſes, and upon which he juſtly adviſes the Practice. But it is my Opinion, that we have no manner of Evidence, that *Nephrotomy* (reſtraining its Signification to *cutting* in the *Kidney* for the *Stone*) was practiſed in his Time, or in many Ages after. For *Celſus*, although he be very particular in his Diſcourſe of *cutting* for the *Stone* in the *Bladder*, is ſilent in this Matter; and *Galen*, who is copious enough upon Diſeaſes of the *Kidneys*, eſpecially the *Stone*, mentions it not. And, indeed, there are no Footſteps that I can diſcover among any of the *Greek* or *Latin* Phyſicians.

The firſt Light which I can pretend to diſcover of the *Operation*, as practiſed in our Caſe, is amongſt the *Arabians*. *Serapion*, who is placed by *Wolfangus Juſtus* betwixt the 10th and 11th Century, tho' by *Ren. Moreau* 300 Years earlier, gives his Opinion of it thus; *Quidam Antiquorum præceperunt* Lapidem Renum *extrahi cum Ferro incidente retro ſuper Latus duorum* Iliorum *in loco* Renum; *Ego autem video quod hæc Audacia eſt difficilis vehementer, & Adminiſtratio iſtius Curationis eſt maximè periculoſa & ſuſpecta de Morte.* Who theſe Antients were that adviſed it, I confeſs to be beyond my Conjecture; unleſs we may be allowed to ſay, that he alſo had miſunderſtood *Hippocrates*, as ſome have manifeſtly done ſince. Betwixt 12 and 1300, *Avicen* had much the ſame Opinion both of the Practice and Practitioners; *Sunt qui laborant Extrahere ipſum per* Inciſionem Ilii *& per* Dorſum: *Sed eſt magnus Timor in eo, & Operatio ejus qui rationem non habet.* The Difference of their Sentiments being only, that one thought it the Undertaking of a Mad-man, the other of a confident Fellow; but from *Avicen*'s Words, there is ſome Colour to believe that it was practiſed in his Days, though undoubtedly, if it were, from his talking ſo ſlightly of it, it was only by Perſons of mean Character, ſuch, perhaps, as our *Mountebanks*; who having no Regard or Concern for the Lives of Men, and little Reputation of their own to loſe, venture boldly, and ſometimes ſucceſsfully, upon thoſe things which wary and more judicious Men avoid. All the reſt of their Writers are ſilent.

Tract.4. c.22.

P. 361. *Edit.* Ven. 1562.

Among the Moderns, as well as I can inform myſelf, *Fr. Roſettus* ſeems to have been the firſt who ſeriouſly adviſed this Practice. But notwithſtanding his Zeal to bring this *Operation* into Uſe; and though he urges *Hippocrates*'s Authority to juſtify the *cutting* into the *Kidney*, he is yet ſo ingenuous as to acknowledge, *Præſente Tumore, nec aliter*, Hippocratem *imperaſſe Sectionem.* And as plauſible as his Reaſonings may ſeem, it does not appear, that he hath been able to gain many Proſelytes to his *Opinion*; the Senſe of thoſe Authors, who have mentioned it (who are not many neither) being generally againſt it, and concluding in Effect with *Riolanus*, *Niſi Naturâ monſtrante viam atque præeunte, nefas eſt tentare* Nephrotomiam. But although it appears to be the concurrent Opinion of thoſe Authors, who have treated of Wounds in the *Kidneys*, that if they penetrate the *Pelvis* they terminate in Death; yet the Experiment above related, ſhews us, that they ought not to have ſo magiſterially exploded the *Operation*.

De Partu Cæſareo.

Ench. Anat, *Lib.* 2. *c.* 28.

An extraordinary Situation of the Vaſa Præparantia; *by Dr.* Nath. Fairfax. *n.*29. *p.* 549.

XCVI. I lately took Notice in the Corpſe of a Felon, that whereas ordinarily the *Preparing Veſſels* ariſe on the Right-ſide out of the *Cava*, as on the Left out of the *Emulgent*, his Right *Vas Præparans* ſprang clearly from the Right *Emulgent*.

The Teſtes *examined; by* Vadlius Dathirius Bonglarus. *n.* 42. *p.* 843. *Fig.* 47, 48.

XCVII. 1. I ſend you two Figures of what I have obſerved concerning the Structure of the *Teſticles*, one of which is taken from the *Teſticle* of a *Man*, and the other from that of a *Boar*, that being larger its Veſſels might appear more diſtinct.

A A, Each of the *Teſticles* cut through the Middle. B B, The *Tunica Albuginea*. *C*, The Inſertion of the *Vaſa Præparantia* into the *Albuginea*. D D, *Highmore*'s *Duct*, running through the Middle of the *Teſticle*, exactly in the Middle in the *Boar*'s, but not ſo in the human *Teſticle*. Whether or not is this *Riolan*'s *fibrous Line*, inſeparable from the Coat of the *Teſticle?* E E E E, The *Vaſa Præparantia*, perforating the *Albuginea*, and running in a Semicircular Courſe into the *Duct*. F F F F, The genuine Subſtance of the *human Teſticle*, not at all glandular, but altogether vaſcular; ſo that the whole *Teſticle* is compoſed intirely of Veſſels. In the *Boar*, between the proper Veſſels of the *Teſticle* there lies a Stratum of true fleſhy Fibres, *f f f f*. *G G*, Slender Tubes, ſometimes more, ſometimes fewer, riſing from the *Duct* in the Head of the *Teſticle*, immediately after it emerges from the *Albuginea*. H H, The Beginning of the *Epididymis*, not glandular, according to *Highmore*'s Opinion of it, but wholly compoſed of Veſſels, connected together by a ſtrong Membrane, according to *Riolan*. Hence you may obſerve the *Epididymis* to be produced from ſmall *Pipes* or *Canals*, and theſe *Pipes* from the *Ducts*. The preparing therefore of the *Semen* is firſt begun in the Veſſels of the *Teſticle*, from which it immediately flows into the *Duct*, and from thence is conveyed by the above-mentioned *Canals* into the *Epididymis*, in the *Meanders* of which it is at laſt perfected. *I I*, The remaining Subſtance of the *Epididymis* plainly Vaſcular, ſo that there is no glandular *Apparatus*, neither in the *human Teſticle* nor *Epididymis*. K K, The *Excretory Veſſel*, a Continuation of the *Epididymis*.

By —— *Ib.* *p.* 484.

2. This Paper was printed at *Florence*, 1658. Since which the Subject hath been conſidered by *D. de Graef*, and lately examined by the *Royal Society* with ſo much Care and Exactneſs, that now there remains but little Doubt of what is, and has been ſo many Years ago conceived, by able Anatomiſts here in *England*, of the Structure of the *Teſticles*, viz. That they are a *Congeries*, or Heap of very fine *Veſſels*, that may be drawn out like a Thread, and diſtinctly expoſed to the Eye.

The Texture of the Teſtes; *by Dr.* Timothy Clarck. *n.* 35. *p.* 681.

XCVIII. 1. What the learned *Van Horne* aſſerts, (together with *de Graef*) that the Subſtance of the *Teſticle* is nothing elſe than a Heap of a Sort of *Chords*, or rather very minute Veſſels, was known long ago, not only to me, but likewiſe to the celebrated *Riolan* and others. I muſt add however, that by the Help of a Microſcope, you can obſerve theſe *Chords* paſſing every where through exceeding ſmall Glands; whence the *Teſticle* reſembles a Kind of pappy Subſtance. But although theſe *Chords* can be drawn out into a conſiderable Length, yet hitherto I could never find that the whole Subſtance of the *Teſticle* could be drawn out like Wool from the Spindle, as ſome Anatomiſts will have it.

2. In *Nov.* 1688, I diſſected the *Teſticulos Cuniculorum Marium* in ſeveral Shapes, and I find the Veſſels in them to lie in round Folds, in the manner of the little *Inteſtines*; but both Ends of each Roll meeting at their Inſertion, which ſeems to be made into the *Ductus Nervoſus*: And every one of theſe little Rolls are very curiouſly embroidered with other Veſſels, which I judge to be Veins and Arteries, by reaſon of their reddiſh Colour, appearing in them even to the bare Eye. Theſe little Rolls lie in Ranges, having a kind of Uniformity, not unpleaſant to behold by a good Light. When I cut one of theſe Rolls tranſverſe, there ſeemed to me 5, 6, or more diſtinct Tubes in one Roll, contained as it were in one common *Membranula*; but the fine Texture and Tenderneſs of them is ſuch, that they will not admit of Expanſion in ſuch a manner, as ſome other *Teſtes* will, and eſpecially as that of a *Rat* is ſaid to do by Dr. *de Graef*, if we miſtake him not. *By Sir* Edm. King. *n.* 52. *p.* 1043.

It was aſſerted by me ſeveral Years ago, concerning the *Parenchyma*, that it is a Congeries of *Veſſels* and *Liquors*, without any intermediate Subſtance: And I have ſince that Time made ſeveral Experiments of the ſame Kind, about the *Teſtes*, the *Pancreas*, and other (ſo eſteemed) *Glands*; and as far as I have examined them, I find them to be only a Texture of fine Tubes or *Ducts*, with more or leſs Liquor, without any other Subſtance. *Vid.* Sup. *c.* I. *Sect.* XI.

I have alſo diſſected the *Teſticulos Tauri*, and ordered them ſeveral Ways; ſome boiled, others broiled, others infuſed in *Spirit* of Wine, hot and cold, *&c.* and upon the beſt Examination I can make, I cannot ſee any of this intermediate Subſtance, or indeed any thing elſe, that is not *Veſſel* or *Liquor*.

I ſhall here add another Experiment, and that is *Teſticuli Humani*, hoping to put it out of diſpute, that it is nothing elſe but a *Congeries* of *Veſſels* of various Sorts, and their ſeveral *Liquors*; and that there is no ſuch thing as an intermediate Subſtance (by what Name ſoever it be called). To demonſtrate this, I expanded on a Glaſs the true and genuine Subſtance *Teſticuli Humani*, I mean, the Body of it after the *Tunica Albuginea* is removed, without any Addition or Diminution, excepting only what *Liquors* dried up during the Time of the Expanſion (which could not be prevented in making ſuch a Scheme of it) and it then appeared to the naked Eye as in the *Figure*.

If it ſhould be objected, that this may be drawn out into ſeeming *Veſſels*, which yet may not be really ſuch; I anſwer, that theſe *Veſſels* have the ſame Appearance in the Body of the *Teſtis*, as to denote them ſuch, before they are drawn out; and in the Extenſion, it does ſometimes ſo happen, that one of them will extend eaſily near half a Yard long before it breaks, though ſo exceeding delicate and tender, as you may imagine: And when *Fig.* 49.

it is thus extended, it hath a kind of Reſemblance to the Corrugations of the *Epididymis*, and keeps the ſame Figure and Magnitude in the whole Extent of them, as to the Sight; unleſs they begin to dry, and then you may ſee them loſe their *Girations* upon Stretching: As you may ſee of both Sorts repreſented in the *Figure*, as they appeared on the Glaſs above mentioned.

And that the greateſt Part of theſe Veſſels are Arteries, or other Veſſels, that immediately receive Liquors from them, I may prove, I think, from another Experiment, made by Injection into a Part of the *Arteria Præparans*, before I went to expand the Body of the *Teſtis*, whereupon opening the Part, which I ſaw diſcoloured, I found that many of theſe Tubes had received ſome of the fine Particles of that Matter, which I tinged my injected *Spirit* with.

And to prevent another Objection that might ariſe, *viz.* that theſe Particles might poſſibly change their Colour only outwardly; I uſed other Endeavours to aſſure myſelf, that the ſaid Particles were indeed included within the Cavities of theſe Tubes. In the doing of which, I did moiſten thoſe two Tubes with *Spirit* of *Wine*, to ſee whether that would remove or alter thoſe Particles: But finding no ſuch thing, I prick'd and open'd with a fine Needle, part of the containing Tube; whereupon I ſaw iſſue forth ſeveral of thoſe liquid Particles afore-mentioned: Which aſſures me farther, that this is a meer Scheme or Congeries of Veſſels.

By Dr. de Graeff. *n.* 52. *p.* 1046.

3. What Dr. *Clarck* ſays, *viz.* that he can ſhew to the Senſes, the *Parenchyma* (which, he ſays, reſembles a Kind of Juice affuſed, or effuſed, and in ſome Meaſure concreted in the Interſtices of the Veſſels, and Fibres) in the *Teſticles* of Men, and thoſe of other Animals; aſking that great Man's Pardon, I cannot admit to be true, unleſs I was to ſee it. Foraſmuch as I have frequently diſſolved the Human *Teſticles*, and alſo thoſe of Brutes, ſo as, excepting ſome very fine ſlender Membranes, not the leaſt Portion of *Parenchyma* remained. Nay, which is ſtill more, I have diſſolved the *Teſticles* of ſome Animals ſo, as even theſe Membranes themſelves quite diſappeared. And in order to prove what I have ſaid by Fact, I have ſent you the *Teſticle* of a Rat, diſſolved according to my Method, that you may ſee whether there are ſuch Glands, or even ſuch a *Parenchyma* in the *Teſticle* as Dr. *Clarck* ſpeaks of. After the ſame Manner almoſt, I can diſſolve the *Teſticles* of other Animals, but with this Difference, that in ſome of them ſome ſlender Membranes remain, and in others, beſides theſe, the Root of *Highmore*'s *Epididymis*.

By —— *p.* 1047.

4. What theſe two laſt induſtrious Phyſicians have imparted, looks very fair to evince, that the *Teſtes* of Animals are made up of nothing but *Veſſels* and their *Liquors*. But notwithſtanding this, Dr. *Clarck* and divers other ingenious and expert *Anatomiſts* and Phyſicians, ſtill doubt, whether that be ſo indeed, conſidering that not only it cannot be denied, that this curious Heap of *Strings*, or ſuppoſed *Veſſels*, was at firſt covered all over with a mucous Matter (which in ſo fine and tender a Part may well be thought to ſerve for a *Parenchyma*) but alſo that M. *de Graeff* muſt himſelf grant, that in the ſaid Part there are found certain ſmall Membranes beſides thoſe

Veſſels he is aſſerting; ſuch another Subſtance being conceived to be highly neceſſary to ſerve for a *Medium*, whereby that compounded *Liquor*, which from the greater *Veſſels* paſſeth into the minute Arteries, Nerves, and *Lymphedučts* of the *Teſtes*, may be ſecreted, and, according to the different Nature and Figure of their ſeveral Particles, conveyed into thoſe ſeveral ſmall and ſubtle *Veſſels*.

5. The internal Coat of the *Teſticles*, eſpecially in *Horſes*, has fleſhy Fibres, or an expanded Muſcle, together with various Veſſels in the middle of its Subſtance, which having different Directions, running tranſverſely, and being woven together in a reticular Manner, as in the Spleen, ſtrengthen and compreſs the *Inteſtinula* of the *Teſticles*.

By S. Malpighi. *n.* 71, *p.* 2150.

XCIX. I here ſend you a Figure of the *Vaſa Deferentia* and *Veſiculæ Seminales*, as they were diſſected from the Human Body, by that experienced Anatomiſt Dr. *Lower* and myſelf. And here I muſt congratulate Dr. *Regner de Graeff*, or rather myſelf, that both of us have found out and aſſerted the ſame Truth; for the Communication of the *Vaſa Deferentia* with the *Veſiculæ Seminales* is ſo very manifeſt, that upon injecting any Liquor into the *Vas Deferens*, there does not a Drop of it go out by the *Foramen* into the *Urethra*, till after it has reached the upper Extremity of the *Veſiculæ Seminales*.

The Vaſa Deferentia; *by Dr.* Timothy Clark. *n.* 35. *p.* 681.

For in the Angle *A*, that Communication is formed in ſuch a Manner, as the *Veſiculæ Seminales* muſt be quite filled before any Liquor can paſs out into the *Urethra*. I own indeed, that the *Semen* paſſes by two *Foramina* into the *Urethra*, but I cannot agree with that great Man, where he ſays, that the Matter of the *Semen* is ſimple: For if the *Teſticle* differs in its Structure, Colour, and Subſtance, from the *Epididymis*, as the *Epididymis* does from the *Proſtatæ*; and if the Juices in theſe Parts differ from one another both in Colour and Subſtance, then certainly different Materials muſt be prepared in them for the *Semen*.

Fig. 51.

Fig. 51. A View of Part of the *Vas Deferens*, with the *Veſiculæ Seminales* of one ſide, as they appeared in the Body before they were cut out. *A*, the Angle of Communication. *B*, the upper Extremity of the *Veſiculæ Seminales*. *C*, the *Vas Deferens*, where we thruſt in a ſmall Syringe. *D*, the *Foramen* opening into the *Urethra*. *a a a*, Part of the *Vas Deferens*. *b b b*, the *Veſiculæ Seminales*. *c c c*, the *Duct* from the *Veſiculæ Seminales* into the *Urethra*.

Explication of the Figure.

C. About a quarter of an Inch below the *proſtate Glands E*, I found two other ſmall *Glands G G*, placed on each Side the *Urethra F*, a little above the Bulb of its cavernous Body *I*. Theſe *Glands* are of a depreſſed oval Figure, not exceeding the Magnitude of a ſmall *French* Bean. After thoſe Parts of the *Muſculus Accelerator l l*, are removed, which paſs over theſe *Glands*, you may feel them placed like two hard Bodies on each Side the *Urethra*. They incline to a yellowiſh Colour, like that of the *Proſtates*. Their *excretory Ducts* appear on their internal Surface *A b*, next the inner Membrane of the *Urethra C*, whence they deſcend about half an Inch in length before they grow

Two new Glands *near the* proſtate Glands, *with their* Excretory Ducts, *lately diſcovered; by Mr.* W. Cowper. *n.* 258. *p.* 364. *Fig.* 52, 53.

grow leſs, and pierce that Membrane obliquely at their opening into the *Urethra D*, in which they diſcharge their ſeparated Liquor. After opening the upper Part of the *Urethra* towards the *Dorſum Penis*, and expanding its inner Membrane, if you compreſs theſe *Glands*, you may ſee their Liquor iſſue from two diſtinct Orifices, which is very tranſparent and tenacious. Theſe two Orifices open into the *Urethra*, juſt below its Bending, under the *Oſſa Pubis*, in the *Perinæum*.

The Artifice of Nature is very extraordinary, in thus placing theſe *Glands*, and their *excretory Ducts*, ſince, on the *Erection* of the *Penis*, and the Diſtention of the Bulb of the cavernous Body of the *Urethra*, they are thereby neceſſarily compreſſed, and the Liquor, contained in their *excretory Ducts*, forced through their two Orifices into the Cavity of the *Urethra*: Beſides this, that Part of the *Muſculus Accelerator* (mentioned above) which paſſes over theſe *Glands*, contributes to this Compreſſion. It ſeems requiſite ſuch Agents ſhould conſpire in compreſſing theſe Organs, ſince the Liquor they ſeparate is ſo very tenacious; which Conſiſtence of it, is abſolutely neceſſary for the Uſes it is employed in.

The main Deſign of Nature in framing theſe *Glands*, ſeems to reſpect the grand Work of *Generation*, which will be more evident, if we examine the *analogous Organs* in other Animals. In *Rats* theſe *Glands* are remarkably large, and are ſo placed, that upon the *Erection* of the *Penis*, they are compreſſed by its Turgency and Appoſition of the *Oſſa Pubis*. The like may be obſerved in other Animals, particularly in *Hedge-Hogs*.

Boars have theſe *Glands* very large, and the Matter they ſeparate is more tenacious, and not ſo tranſparent as in all other Creatures I have examined: There is ſomething peculiar in the Contrivance of them in this Animal, each *Gland* being covered with a peculiar Muſcle not unlike the *Gizards* of ſome Fowl; which Mechaniſm ſeems contrived for more forcibly compreſſing of them, to diſcharge their very tenacious Contents into the *Urethra*, and that not only in the Time of *Coition*, but at any other Time; which ſeems to be more peculiarly required in thoſe Creatures, becauſe the *Paſſage* of their *Urine* is very long, and therefore ſtands in need of more of this *glutinous* Matter to beſmear it, whereby it is defended from the Injuries that may ariſe from the *Salts* of the *Urine*. As the *Urine* of different Animals is more or leſs impregnated with pungent *Salts*, ſo the Proportion of theſe *Glands* differ, as well as on the account of the various Lengths of their *Urethra's*. It is remarkable we do not find theſe *Glands* in *Females* like thoſe in *Males*, though they have ſomething analogous to them, which are deſcribed in *Women* by *De Graeff*, and called *Proſtatæ Mulierum*; but the Orifices of the *excretory Ducts* opening at the Exit of the *Urethra*, they ſerve to defend the *Nymphæ* and *Labia Pudendi* only from the *urinous Salts*, and diſcharge their Liquor in *Coitu*, as I have elſewhere taken notice; the whole *Urethra* in them being ſo ſhort, that the Contraction of the *Sphincter* Muſcle of the *Bladder* is ſufficient to expel any Remains of *Urine* from that Paſſage.

The Uſe of theſe *Glands* is twofold; *Firſt*, on the *Erection* of the *Penis* there is ſo much of their Liquor diſcharged into the *Urethra*, as ſuffices to drive out any Remains of *Urine*, and prevent its mixing with the *Semen*; and at other Times the continual Diſcharge of ſome Part of their Liquor into the *Urethra*, defends that Paſſage from the *Salts* in the *Urine:* The like continual Exudation cannot happen either from the *excretory Ducts* of the *Proſtates*, or thoſe of the *Veſiculæ Seminales*, becauſe the nearneſs of the *Sphincter Muſcle* ſo corrugates the inner Membrane of the *Urethra*, as prevents an eaſy Paſſage of the Liquor by the *Oſtiolæ* of the former; nor can the *Semen* run out of the latter, ſince the *Caruncula*, or *Caput Gallinaginis*, is contrived on purpoſe to prevent it: Wherefore the *Diaphragm*, *Abdominal* Muſcles, and *Levatores Ani*, are employed in compreſſing thoſe Parts to diſcharge their Contents.

It is not improbable that the Matter, which flows at the latter End of the Cure of *Venereal* Diſeaſes, and is called a *Gleet*, proceeds from theſe *Glands*, and not from the *Proſtatæ*, or *Veſiculæ Seminales*, as is commonly ſuppoſed; which may afford us no mean Argument for the Uſe of *Injections* in ſuch Caſes; inſtead of which ſome Practitioners perſecute their Patients with violent Purges, and cram them with vaſt Quantities of aſtringent Medicines. We may eaſily conceive ſuch *Gleets* become ſometimes very obſtinate, if not incurable, by ſuppoſing the *Ulcer* in that Contact to happen upon the *Oſtiolæ* of theſe *Secretory Ducts*.

Explication of the Figures.
Fig. 52.

Fig. 52. *A*, A Portion of the *Bladder* of *Urine*. *B B*, Parts of the *Ureters*. *CC*, Parts of the *Vaſa Deferentia*. *D D*, The *Veſiculæ Seminales* ſomewhat diſtended with Wind, by blowing into the *Vaſa Deferentia*. *a a*, The Blood Veſſels of the *Veſiculæ Seminales*. *E*, The *Glandulæ Proſtatæ*. *F*, The *Urethra* expanded, after opening its Superior and Fore-part, to ſee the *Oſtiolæ* of the *excretory Ducts* of the following *Glands*. *GG*, The two *Glands* above deſcribed, which, from the Liquor they ſeparate, may be called *Glandulæ Mucoſæ*. *b*, The *excretory Duct* of the laſt mentioned *Glands*, before it paſſes under the Bulb of the cavernous Body of the *Urethra*. *I*, The Bulb of the cavernous Body of the *Urethra*, partly diſtended with Wind, and diveſted of the *Accelerator* Muſcle, to ſhew its external Membrane, which is very thin, whereby the laſt named Muſcle, does more adequately compreſs that Bulb, and derive its contained Blood towards the *Glands*, when the *Penis* is erected. *K*, The 3d Pair of the Muſcles of the *Penis*. *L L*, The *Accelerator* Muſcle, divided in its middle Seam on the Bulb, and afterwards freed from it, and expanded. *l l*, The upper Part of this Muſcle, which paſſes immediately over the *mucous Glands*. *M M*, The *Muſculi Directores Penis*. *N N*, The cavernous Bodies of the *Penis*. *O*, The cavernous Body of the *Urethra*. *P*, The Ligature made to prevent the Wind from paſſing out of the cavernous Body of the *Urethra* and its Bulb. *Q*, The Aperture by which the Inflation was made.

Fig. 53.

Fig. 53. One of the *mucous Glands* after being macerated in Water, and its *excretory Duct* filled with Quickſilver. *A:* The *mucous Gland*, ſomewhat diſtended. *b*, Its *Excretory Duct*. *C*, A Portion of the internal Membrane of the *Urethra* expanded. *D*, The *Oſtiola* of the laſt mentioned *excretory Duct*.

The Structure of the Uterus; *by S.* Marc. Malpighius. *n.* 161. *p.* 630.

CI. In this which is the moſt obſcure of all the *Viſcera*, in the unimpregnated State, upon Account of the Veſſels being ſo contracted and contorted, the Parts it is compoſed of are ſo interwoven together, that it is hardly poſſible to diſtinguiſh them from one another. But in the pregnant *Uterus*, (eſpecially in Brutes) we are able to unravel the Structure a little. I therefore took to examine a Cow's *Uterus*, both becauſe it is eaſier come at, and being large, its component Parts are not ſo obſcure. The external Membrane is very thick, covers over and ſtrengthens the whole *Uterus*, *Tubes*, *Vagina* and *Appendages*. Under this are placed fleſhy Fibres, which running lengthways, and here and there forming a Kind of fleſhy Bands, are differently waved. They are connected, however, with one another, eſpecially towards the *Tubes*, and not far from the *Ovaria* are gathered into little Bundles or *Faſciculi*. Others again run horizontally, according to the Thickneſs of the *Uterus*, and adhere by very fine Membranes on different Planes, ſurrounding the whole *Uterus*. Not far from theſe the *Lymphatick Veſſels* occur turgid with Lymph, which being held to the Fire, at laſt evaporates. Under theſe Veſſels again run the *Veins* and *Arteries* here and there upon the *Uterus*, and form an elegant Kind of Net-work, the *Area* of which again, makes ſtill a different Appearance. And I have frequently obſerved, that one Branch of the *Arteries* is commonly accompanied with two of the *Veins*. There are likewiſe *Nerves* beſtowed on the whole Surface of the *Uterus*.

I have likewiſe obſerved other Veſſels or Ducts proper to the *Uterus*, which are pretty large and remarkable, eſpecially in Time of Pregnancy. Theſe Veſſels of which I now ſpeak are variouſly produced, ſeeing they partly emerge from the Subſtance of the *Uterus*, and partly lie concealed within its Cavity. They are two in Number, one of them on each Side, running here and there upon the Sides of the *Uterus* and *Vagina*, eſpecially in that Part where the *Uterus* is contiguous to the *Bladder*; and though they are extended from the Extremity of the *Vagina*, to where the *Horns* of the *Uterus* begin to grow ſlender, yet they have not every where the ſame Form, nor are they of the ſame Bigneſs, neither do they run in the ſame Plane; for the lower Portion, which terminates not far from the Orifice of the *Urethra*, marches directly upwards, immediately under the Membrane that lines the *Vagina*, towards the *Mouth* of the *Womb*. This Portion very frequently will hardly admit a Probe; and ſometimes it is as broad as one's middle Finger, and opens into the *Vagina*, with a broad conſpicuous Orifice, for the moſt Part above the Orifice of the *Urethra*, or *Meatus Urinarius*. Not far from the Corrugations at the *Mouth* of the *Womb*, theſe *Ducts* ſeem to become obliterated, and there only occur (as I thought I diſcovered) ſome very ſmall Holes and Pores ending in one continued Veſſel. This obſcurer Portion then of theſe Veſſels riſing evidently from a *Duct*, and hid amongſt fleſhy Fibres, is continued upwards upon the Sides of the *Uterus*, where it is narrow, till flying off from its *Neck* externally it emerges upon its Productions. Theſe Veſſels put on a great many different Forms, and require an accurate Scrutiny to make them be rightly underſtood. For frequently where they lie internal, they become ſo very ſlender, that they can hardly be ſeen; often enough you ſee them riſe in the Form of a great many large round Buttons, making a Kind of Crown, and ſometimes they run ſtreight like other Veſſels turgid with Liquor. That Portion of theſe *Ducts* which emerges from the *Neck* of the *Uterus* over the fleſhy Fibres, and under the Blood-Veſſels, is extended laterally upon the *Body* and *Horns* of the *Uterus*, and diſtributes its Branches to the internal Circumvolution of theſe *Horns*, its ſmall Extremities ending in the *Tubes* where they grow narrow. Theſe Veſſels, though they are Tubulous, and run on in an uninterrupted Courſe, yet they put on various Forms, both from their ſurrounding Sheath or Ligament, and from their internal Structure; for that Part of them that runs upon the *Vagina* is ſinuous, and produced ſtreight upwards. The Membrane which lines them internally is rough, having round Orifices laterally, which will admit the End of a Probe, but will not allow it to go far; and here and there are placed ſmall roundiſh Glandular *Folliculi*, opening into the Cavities of theſe *Ducts*. There are likewiſe ſeveral Membranes ſtretched acroſs like *Valves*, whence in ſome they riſe up like *Cæcal Appendages*, ſuch as are obſerved on the *Inteſtinum Colon*. Near the Orifice of the *Uretbra* theſe Veſſels become broader, and frequently they ſwell into a ſinuous Head, from which the tortuous *Ducts* open into the Cavity of the *Vagina* by two obſcure Orifices hard by the Extremity of the *Uretbra*. The upper Parts of theſe Veſſels, running upon the Sides of the *Os Uteri*, is guarded, as it were, in a cartilaginous Sheath, whence it becomes varicous, and ſeems to puſh out here and there into roundiſh Appendages, eſpecially where the ſurrounding Sheath ſwells out into the round Knot or Button abovementioned, in which however is contained a ſtreight Tube turgid with Liquor; for that cartilaginous Sheath being removed, the tender Membrane of the Veſſels appears. At laſt that Portion which riſes from the *Neck* of the *Uterus*, going out in the Form, and of the Bigneſs of a Quill, is included for ſome Space in a firm Sheath, and afterwards being ſurrounded with a ſpiral Ligament, as it were, it puts on a beautiful Appearance, gradually decreaſes, is ſtudded here and there with lateral Appendages full of Liquor, and running on till it gets to the *Curvature* of the *Horns*, then ſplits into a great many ſmall Branches, which are diſtributed to the *Uterus*, where it becomes ſmall. But as you cannot puſh an Injection to the Extremities of theſe Veſſels, therefore their ultimate Terminations are not yet diſcovered. Sometimes inſtead of Branches I have obſerved Appendages or *Loculi* turgid with Liquor. Theſe Veſſels in Time of Pregnancy are ſo lengthened and diſtended, together with the *Uterus*, that in Cows I have ſeen them as long as one's Arm, and very turgid, ſo that they were extremely conſpicuous. Theſe Veſſels are filled with a paliſh Fluid, of a different Conſiſtence in different Parts; for in the ſinuous Portion which runs upon the *Vagina*, it is frequently *mucous*, and often enough congealed, as it were, into a thick Jelly or Pap; while in the other Productions it reſembles *Turpentine* both in Colour and Clammineſs, and expoſed to the Fire it raiſes a great many Air Bubbles, and at laſt leaves a glutinous Recrement like Amber.

But in order to diſcover theſe Veſſels, and every Thing about them, you muſt firſt clear away the *Bladder* with the ſurrounding Membranes, together with the Blood-Veſſels and fleſhy Fibres, ſo as to lay bare the *Uterus* externally immediately above the *Mouth*, as alſo its *Cervix* and *Horns*, and you will immediately ſee theſe tubular Veſſels emerge here and there upon the *Neck* of the *Womb*, and may purſue their Progreſs farther upon the Sides of the *Cornua*. But the lower Portion of theſe Veſſels will appear to you upon finding out their Orifices into the *Vagina*, not far from the *Mouth* of the *Womb*. Sometimes the Liquor contained in theſe *Ducts* ſhines through, ſo as upon looking at the internal Surface of the *Vagina*, you ſee broad Lines running according to the Length of it, and upon making a *Foramen* into one of theſe Lines, you can thruſt in a Probe, which gradually penetrating runs as it were through the whole *Vagina*. But in order to diſcover the intermediate and more obſcure Portion and Continuation of theſe Veſſels, you muſt carefully diſſect off the Sheath, which covers them immediately as they ariſe from the *Neck* of the *Womb*, and the yellowiſh Membrane of the contained *Duct* will ſhew you their Courſe; for although theſe Veſſels are ſlender and varicous, yet after having cut through the fleſhy Fibres of the *Uterus* longitudinally, and through the varicous Prominences, they will at laſt diſcover themſelves. Sometimes when they happen to be turgid with Liquor, they appear very obvious, large and ſtreight.

If you cut through the *Uterus* according to its Thickneſs, eſpecially in Impregnation, after having got through the Coats, and confuſed Layers of the Veſſels and fleſhy Fibres, for the Space ſometimes of Half an Inch tranſverſely, you meet with a reticular Texture, by which ſome *yolky Bodies*, ſupplied with proper Blood-Veſſels and produced as far as the internal Subſtance of the *Uterus*, are kept firm, and a Series of very ſmall Veſſels playing about them, there is formed, as it were, a Kind of *Omentum*. The *Uterus* is lined internally with a Membrane, which has an innumerable deal of very ſmall Orifices, pouring a glutinous *mucous* Liquor into its Cavity, with which both it and the *Vagina* are perpetually moiſtened, and upon compreſſing the *Uterus* you ſee it ooze out. Theſe Orifices of the excretory Veſſels appear very plain, eſpecially in *Sheep*, if the internal Membrane of the *Uterus* is long macerated in Water; wherefore it is probable that they are the Orifices of the *yolky Bodies* juſt mentioned, opening into that Cavity; but whether they have ſmall *Glands* annexed to them, which cannot be diſtinctly diſcovered to the Senſes, is not quite certain, yet it appears very probable from Nature's conſtant uniform Method of Operating. There are likewiſe obſerved on the whole internal Surface of the *Uterus* and its *Horns*, a great many *Tubercles* of unequal Bigneſs, riſing a little prominent, which in the Time of Pregnancy grow conſiderably turgid, and ſeem to be *Appendages* to the *Uterus*, or a Congeries of *Vaginulæ*, whence they have obtained the Name of *Cotelydons*. They admit the Extremities of Veſſels going out from the *Chorion*, ſo that from theſe two connected thus with one another, there is formed, as it were, a compleat *Gland*, whereby the *Fœtus* is ſupplied with Aliment, ſeparated from the *Uterus*. This compact Body then, compoſed of two Parts, puts on the Form of a little *Placenta*, or a roundiſh flat Subſtance, of different Colours; for that Part of it which is produced from the *Uterus* is of an aſh Colour, and the other is reddiſh. That Half which belongs to the *Uterus* is a Congeries of little *Vaginulæ* and *Sinuſes*, going deep into it, whence by injecting of Ink, they appear very conſpicuous. Its Subſtance differs little from that villous Coat, with which the Stomach and Inteſtines of ruminating Animals are lined; for it has roundiſh little *Appendages* produced from it, and oozes out upon Compreſſion a conſiderable Quantity of a Juice very like *Ptiſan*. It is well ſupplied with Blood-Veſſels, whence upon injecting Ink by the *Uterine Artery*, it becomes wholly black. I have ſometimes ſeemed, though obſcurely, to diſcover a yellowiſh Kind of Veſſel here, the farther Diſcovery of which I leave to your Induſtry. The other Part of that Gland, which is produced from the *Chorion*, is compoſed of ſcattered *Roots*, as it were, which enter into the *Vaginulæ* or *Sheaths* above deſcribed. This, when it is ſeparated from the other, macerated long in Water, and viewed through a Microſcope, makes a very beautiful Appearance; becauſe the *Roots* being now free, raiſe themſelves gradually ſo as to reſemble a beautiful little *Grove*; for there are innumerable Trunks dividing into Branches, and theſe again ſubdividing into ſtill ſmaller and ſmaller, till at laſt they become almoſt inviſible. Its Subſtance is the ſame with that of the *Vaginulæ*, and it is ſupplied with Blood-Veſſels in ſuch a Manner, as that even the ſmalleſt Branch has its proper Blood-Veſſels running in the Middle of it.

The Structure of the *Womb* in *Women* is ſo obſcure, that it is almoſt impoſſible to unravel it; for when it is contracted, its Veſſels are ſo complicated and varicous, that there is no Room even for the moſt accurate Diſſection. I ſhall inform you however, of all that I have been able to obſerve from repeated Diſſections of the human *Uterus* in Women, who have either died after Labour, or about the ſeventh Month of Pregnancy. In theſe then the *Womb* is about an Inch in Thickneſs, and is plentifully ſupplied with Blood-Veſſels, which form a kind of Network. The external Structure of the *Uterus* is compoſed of fleſhy Fibres gathered into Bundles, and interwoven with one another in a reticular Manner, and the internal likewiſe is a *Congeries* or *Plexus* of ſtrong fleſhy Bands, running in various Directions. Amongſt theſe fleſhy Fibres are extended a great many thin Membranes or ſoft Coats; over which innumerable large *Sinuſes*, like Veſſels, run longitudinally, which being placed in different Planes, are ſupplied with a great many Orifices directed to every Circle, whereby there is a mutual *Anaſtomoſis* between the neighbouring *Sinuſes*. We have ſomething of this Structure in the ſmall *Tubes* of the *Breaſt*, and in the *Penis*. They contain a little Blood, ſo that they ſeem to be a Kind of *Diverticula* to the *Veins*, or at leaſt to their *Appendages*; and at a little Diſtance from them run Branches of the Blood-Veſſels, almoſt in the ſame Manner as in the *Spleen*. The *Chorion* and *Placenta* being removed, the internal Subſtance of the *Uterus* next occurs, and is muſcular, being compoſed of fleſhy Fibres variouſly interwoven, and ſupplied with Ramifications of Blood-Veſſels from the little Chinks. To this Surface of the *Uterus*, during the Time of Pregnancy, adhere certain *Pellicles*, which are connected chiefly to the *Chorion* and *Placenta*. They are ſoft and mucous, and very eaſily tore. From theſe there ſeems to be produced and ſupported a Kind of Network, compoſed of ſome aſh-coloured, friable, round Bodies, forming Lozenges laterally, and very much reſembling the *Omentum* of *Fiſhes*. About theſe Bodies play the varicous Branches of Blood-Veſſels, ſtretching themſelves towards the *Chorion* and *Placenta*. Whether theſe Bodies, interwoven in this reticular Manner, are fleſhy Fibres, or Nerves, or rather the Excretory Veſſels of the *Uterus*; I leave you to judge. Next occurs the *Placenta*, together with the *Chorion*, firmly connected to the *Uterus*; but as the Parts which compoſe it are very friable, mucous, and variouſly entangled with one another, it is not poſſible quite to unravel its Structure. This, however, ſeems certain, that the *Placenta* is compoſed of the Umbilical Veſſels connected and kept firm by a peculiar Subſtance. And as the *Cotelydons* are ſupplied with a proper Subſtance, which ſupports the Blood-Veſſels, and ſerves them by Way of a Sieve or Strainer, ſo the *Placenta*, which is only a Heap of *Cotelydons*, viz. of thoſe Parts which enter the *Vaginulæ* of the *Uterus*, is conſequently a Congeries of Roots and Branches from the Umbilical Veſſels, which are produced over the unequal Glandular Subſtance. I have ſometimes thought I diſcovered round Globules, or Glands, ſuch as we obſerve in the *Kidneys*, along with the Blood-Veſſels; but upon dipping the *Placenta* into Water, theſe Glands did not occur, only I obſerved here and there ſcattered Bodies, plentifully ſupplied with Blood-Veſſels, reſembling the Roots of Plants. The Surface of the *Placenta*, where it is connected to the *Uterus*, is unequal, ſeeming by its Appendages to enter the *Sinuſes* and Concavities of the *Uterus*, after the Manner of the *Cotelydons*.

The Form of the Womb is different in almoſt every Species of Animals, and is deſcribed ſo accurately by Anatomiſts, that I need not inſiſt upon it here. But this ſeems to be a conſtant Rule, that they ſhould all be provided with Tubes, which are moſt luxuriant in the Wombs of Plants. Not far from the *Tubes* are placed the *Ovaria*, which amongſt the old Anatomiſts were looked upon to be the *Teſtes*. In Cows, where they are large and very plain, they are ſurrounded with a Membrane ſtrengthened with fleſhy Fibres. After what Manner the *Ovum* burſts from the *Ovarium*, and is conveyed into the *Tubes*, requires a good deal of Trouble and Application to find out. But what I have been able to diſcover from accidental Surveys of the *Ovarium* in *Cows*, I ſhall diſcloſe to you in a few Words; for it has not been in my Power, as I did in the *incubated Egg*, to make a ſucceſſive Series of Obſervations in a great many Quadrupeds killed at certain Times of Pregnancy, becauſe that would require an extraordinary Fund of Money, which however has been allowed to *Harvey* and a few others. But this appears certain in young adult Quadrupeds, and eſpecially in *Cows*, that the *Ovaria* contain a great many *Veſiculæ* or little *Bladders* turgid with *Colliquament*, which concretes with the Heat of a Fire like the white of an Egg. I have oftener than once ſeen one of theſe *Bladders* hanging from the

Ovarium, larger than a Hen's Egg, and full of *Albumen*. Theſe *Bladders* are provided with a pretty thick Coat, the inner Surface of which (as I have ſeveral Times obſerved) is ſupplied with extraordinary *Plexuſes* of Blood-Veſſels. After ſome Time there emerges a yellowiſh ſolid Body, which grows to ſuch a Bigneſs, as to make the whole *Ovarium* protuberate in the Form of a *Nipple*, and when it is grown to its full Size, is as large as a Cherry. Its external Surface is rough, occaſioned by ſome ſmall unequal Tumours riſing upon it, and is ſurrounded with fleſhy Fibres, which inſinuate themſelves into its Subſtance, as is obſerved in the Glands. It is likewiſe ſupplied with Nerves and Blood-Veſſels. It is involved in a Membrane, eſpecially in the *Papillary Appendicle*, which is covered beſides with the common Coat of the *Ovarium*. This Body is compoſed of different Portions or Lobes, as it were, ſuch as we find in ſome of the other *Viſcera*; but they are angular, and inclined in various Directions, for they ſeem to hang, as it were, to the Blood-Veſſels, and to the produced *Umbilical* Rope. The Structure of theſe little Lobes is obſcure, and compoſed of varicous Veſſels of a yellow Colour, with which roundiſh Bodies with the Gold-coloured Appendages, and very ſmall Pieces of Fat are connected together. The external Configuration of the above deſcribed yellow Body or *Corpus Luteum* is not always the ſame, but various at various Times. For ſometimes, to begin with the more ſimple, you ſee it a *conglobate*, intricate Kind of Body, compoſed of varicous Productions, of a yellow, and ſometimes ſomething of an Aſh Colour, hardly exceeding the Size of a Millet or Vetch Seed. Frequently at that Time, about the little *Bladders* filled with *Colliquament*, or the White of the Egg, and ſtill very ſmall, the external Covering of the *Corpus Luteum* is rendered more compact, and as it were ſupported with a yellow Subſtance; often enough, this yellow Body, when it is about the Size of a Vetch, puts on the Figure of a Pear, and growing gradually narrower, internally from the Center towards the Neck, it has a *Sinus* or Cavity turgid with *White*. Frequently after it is grown to the Bigneſs of a *Cherry*, burſting out from the *Ovarium* at the external Part of the *Papilla* or *Nipple*, it contains in its Center a little *Bladder*, like a Cherry-Stone, full of *Colliquament* or *White*; and this *Bladder* is ſometimes round, and often enough has a good many *Styliform Appendages*, but more frequently there is only one of theſe *Appendages*. Sometimes too in this yellow Body, when it is arrived at its full Growth, there is almoſt nothing of *White* to be found; but moſt frequently from the inner Coat of the *Papilla*, where for the moſt Part you may obſerve a Depreſſion externally, and afterwards a *Foramen*, there is produced a Kind of Membranous Aſh-coloured Body, very probably vaſcular; which being ſtretched out perpendicularly towards the Center of the yellow Body, is divided into Branches in a vaſcular Manner, diſtributed thro' all the Subſtance of that Body, and to them are fixed ſmall Lobes differently inclined, or in different *Planes*. In ſome of the ripe *Corpora Lutea*, towards the Center, you may obſerve the little *Ovum* with an *Appendage* of the Bigneſs of a Grain of Millet, contained in the above deſcribed Aſh-coloured Body. Frequently there is opened a Kind of *Meatus* or *Duct*, going to the *Center* of the *Papilla*, in which is contained a Diaphanous Liquor, which concretes with the Heat of the Fire like *Albumen*, and often enough a ſmall *Ovum* or two with their *Appendages*, not unlike in their Figure to thoſe of the Moſs of Galls or *Oak Apples*. At laſt theſe yellow Bodies or *Corpora Lutea* are rendered effete, perforated with a *Sinous Duct*, whoſe Orifice opens externally from the Middle of the *Papilla*, ſo as to admit a Probe, but the included Cavity is about as large as a Pea; and is lined with a ſurrounding Membrane, as alſo the Duct. Theſe Things being then obſerved at different Times, and in different Subjects, make it ſeem very probable, that the *Corpus Luteum* of the *Ovarium* is made not only to preſerve the *Egg* and ſend it out at a proper Time, but perhaps it may contribute in ſome Meaſure to its Generation, and therefore ought rather to be looked upon as Glandular than Muſcular. For its Structure is not fibrous, nor fleſhy, but rather like that of the *Renes ſuccenturiati*, whence it may probably be ſuſpected that through this glandular Strainer is ſeparated a Kind of Matter, which being tranſmitted through the Branches of the *Umbilical Veſſels*, is changed into the *Ovum*. A Production analogous to this we ſee in the *Ova* of *Plants*, in which the *Umbilical Rope* emerges firſt, the Extremity of which is gradually relaxed and ſwelled from the *Colliquament* entering it, and thus at laſt produces the *Plant*. From the ſame Obſervations it may likewiſe be doubted, that the little *Bladders*, which are at all Times in great Numbers in the *Ovaria*, of unequal Sizes, and filled with concreting *White*, it may be doubted, I ſay, that theſe are not the true *Ova*, which are at laſt impregnated, but that Subſtance which perhaps ſerves to conſtitute originally the glandular *Corpus Luteum*. For it does not appear certain, that that Body is only made manifeſt after *Coition*, and the *Affuſion* of the Male Seed, and that this produces the Signs of the *Ovum* being impregnated; becauſe very frequently I have found in Calves, that were new born, one or two remarkable *Veſiculæ*, with this luteous Subſtance growing to it like Graſs. In *Cows* too, eſpecially in the Time of Pregnancy, and in different Ages of the *Fœtus*, I have ſometimes obſerved theſe *Corpora Lutea* ſometimes of the Size of Vetches, ſometimes as large as Cherries in the *Ovaria*, and a good Number of them, though there was no Suſpicion of a Superfetation. I obſerved the ſame Thing in a *Woman* about the eighth Month of Pregnancy, and in one and the ſame *Ovarium*, in different Animals, there are ſeveral of theſe Bodies of different Sizes, in which there is no ſuch Multiplicity of *Fœtuſes* ſucceed. To theſe I may add, that in moſt *Ovaria*, eſpecially when they are boiled, there are large Veſſels turgid with a concreted luteous Juice. It may likewiſe be queſtioned, whether only one *Bladder* of *Albumen* is conſumed in producing one *Corpus Luteum*, or whether there are not more; for when the *Corpus Luteum* is come to Perfection, it takes up not only the whole Concavity almoſt of the *Ovarium*, but frequently a few of theſe *Bladders* are connected to it while they are very numerous upon other Parts of the *Ovarium*. Theſe Things then being conſidered, you will find it not improbable, that this *Luteous Glandular* Subſtance does not immediately ariſe upon the Affuſion of the *Semen* into the *Ovum*, contained in the *Ovarium*, but that it precedes it a long while, and that there are likewiſe impregnated *Ova* or *Addle-Eggs*. That theſe Bladders too filled with *Colliquament* or *White*, are not ſtrictly *Ova*, but a Subſtance of which a Gland is compoſed, which prepares the *Ovum*, nouriſhes and ſends it out, after a certain Time. But the little *Ovum* burſts, or is thruſt forth, when the protuberating *Papillæ* of the *Ovarium*, by the Contraction of the fleſhy Fibres, is ſqueezed outwards, and the ſurrounding Membrane being gradually tore, the little *Ovum* is puſhed out, leaving a little Cicatrix or *Sinus* behind it. For ſometimes I have ſeen a little *Nipple*, like a *Præputium* from the fleſhy Fibres, ſurrounding the *Ovarium*, being tore where there was an Opening into the Cavity of the glandular Body. But the little *Ovum*, as it happens in *Hens*, is received ſafe into the *Tube* to be impregnated, by the Contraction of the fleſhy Fibres at the Extremity of the *Tube*. After the *Ovum* is extracted, the glandular Body growing gradually flaccid decays, and is eaſily obliterated, as the *Glands* and even the *Viſcera* become almoſt aboliſhed, upon the Blood-Veſſels being any Way ſtraitened or compreſſed.

Upon conſidering the Structure of the *Uterus* thus explained, I muſt beg leave to mention ſome Conjectures of my own about it. The *Womb* by its Nature is the Subject of *Vegetation*, in which the *Seed* or *Eggs* thrown into it are nouriſhed, and the Parts of the little animal *Fœtus* are unfolded as it were, become more apparent and ſtrong. And though the *Ovum* is bred and ſown as it were in the Female, yet of itſelf it is barren, and can produce no Effect, and therefore it requires the Aſſiſtance of this *Male Seed* to invigorate it, and infuſe into it a Principle of *Vegetation*. Wherefore, according to the Laws of Nature, *Women*, in the ſame Manner as all other Females, produce *Eggs*, which being received into the *Womb*, and impregnated with the *Male Seed*, produce a new *Animal*. But in what Manner the *Egg* is rendered fruitful, eſpecially in *viviparous Animals*, Anatomiſts do not agree in their Opinions. Moſt Part of them think, that the *Seed* is conveyed to the *Egg* while it is connected to the *Ovarium*, by Means of a certain Duct peculiar for that Purpoſe: Others, again, imagine, that theſe two do not meet till the *Egg* has fallen into the *Uterus*: Laſtly, ſome are of Opinion, that the whole Tone of the *Uterus* is changed, and even the Blood itſelf altered by the Spirit of the *Semen*, whereby the *Egg* is at laſt rendered fruitful. But it is plain, and you will find it ſo, upon diſſecting the *Uterus* in different Animals, that there are Obſtacles which occur ſo as to hinder the *Seed* from getting into the Cavity of the *Uterus*. In *Cows*, there is a thick Liquor, or Jelly, with which the *Womb* is not only beſmeared internally, but its Mouth, and the upper Part of the *Vagina* is blocked up; and as this may hinder the Subſtance of the *Seed* from entering the *Uterus*, ſo it may very probably afford a proper *Menſtruum* or Vehicle for entangling the finer and more ſpirituous Parts of the *Seed*. This Liquor then oozing out from the above-mentioned Veſſels, which open upon the internal Surface of the *Womb* and its *Tubes*, not only moiſtens the whole *Uterus* and *Vagina*, but meets with the *Seed* poured into the *Vagina*, and confining its volatile Particles mixes them intimately with its own, whereby it at laſt ferments and ſwells. This

Motion by the Contiguity of Parts is communicated to the *Uterus* and its Humours, ſo that a new Tone, Conjunctions and Motions, ſo to ſpeak, ſucceed there. The *Egg* then being received into the *Womb* from the *Ovarium* by means of the *Tubes*, may be ſufficiently moiſtened, and made fruitful by the active Spirit of the *Seed*, from which the Beginning of Motion ſeems to ariſe. Hence, perhaps, it was that *Hippocrates* pronounced thoſe *Wombs* to be barren that were either *dry*, or too much *moiſtened*; for in the firſt, the impregnating Principle is not confined nor propagated; and in the other, it is either diſſipated or flows out, ſo that *Conception* only obtains in *Wombs* of a moderate *Temperament*. There is ſomething like this to be obſerved in *Butterflies*, in which there is a large two-horned *Bladder*, connected to the Extremity of the *Ovarium*, from which a glutinous Liquor perpetually diſtills into the Cavity of the *Vagina*, with which the *Male-Seed*, and another Liquor which is ſpued out from a little lateral Sack are mixed, and as it were cohobated, by all which the *Eggs* in their Paſſage are beſmeared and rendered fruitful; and thus for ſeveral Days that Plaſtick Force is preſerved, and communicated the following Days to the *Ova* as they paſs. This we may likewiſe conceive to be the Caſe in *Hens*; in which the Energy of the *Seed* once received is preſerved a good while, ſo that the *Eggs* which are laid afterwards are fruitful. And ſince in *Hens*, Nature not only pours the *Seed* of the *Cock*, or ſome other Liquor impregnated with the *Seed* to the *Cicatrix*, in which the Rudiments of the *Chick* are contained, but endues the whole *Egg*, or that Aliment under the Form of *White* and *Yolk*, with a Plaſtick Force, ſo that the whole is rendered fruitful; therefore, as the *Uterus* turgid with Humours, and ſurrounding the little *Ovum*, is analogous to the *Hen*'s *Egg*, it is probable likewiſe that it is rendered fruitful together with its contained Humours; for this may be done by means of that Liquor which flows into the Cavity of the *Uterus* turgid with the *Seed*. But it may be queſtioned whether the Veſſels of the *Womb* above deſcribed contribute to this Fertility or not: And, at firſt, it ſeems probable that the *Female Seed*, or at leaſt the Liquor of the *Proſtatæ*, may ſerve inſtead of that *Ichor* or Liquor above deſcribed, and thence together with the *Seed* of the *Male* may communicate a proper Energy to the *Egg*. But as theſe Veſſels are produced all along the *Uterus*, their Extremities running upon the *Cornua*, and are turgid with a glutinous Liquor, eſpecially in the Time of Pregnancy, I am therefore led to doubt, whether the Liquor contained in theſe Veſſels is not conſiderably changed by the volatile Particles of the *Male Seed*, and thence the more external Parts of the *Uterus*, and of its Horns eſpecially, are rendered fruitful; in which Conception is firſt begun, and the Increaſe and Nouriſhment of the *Fœtus* ſucceſſively carried on. Nor will you think this improbable, if you only conſider how eaſily this Humour is altered by the *Male Seed*, ſeeing that ſometimes from one ſingle Coition with a Perſon touched with the *Venereal* Diſeaſe, it ſhall become ſo corrupted, as growing more acid to drill conſtantly away, and preſerve the Taint it has received a long while. The *Egg* then, after it has fallen down from the *Ovarium*, is quite beſmeared with the *Uterine Menſtruum*, impregnated ſtrongly with the volatile Particles both of the *Male* and *Female-Seed.* The *Womb* likewiſe, with its contained Humours, grows ſo turgid both within and without, that the Blood having received a new Motion within its Veſſels, makes a longer Stay there, the *Cotelydons* ſwell out, and all the Humours becoming more fluid and moveable, the Nutrition and Growth of the *Fœtus* in the *Ovum*, are carried on.

Nature varies in that mechanical Apparatus, whereby the Humours are conveyed from the Veſſels of the *Uterus* to the *Fœtus* ; for a *Placenta* or ſomething analogous to it frequently intervenes. The Structure of the *Cotyledons* above explained is very remarkable, for it is a conglobate Gland of its own Kind, ſo to ſpeak, in which a Portion of the *Womb*, ſupplied with its own proper Fleſh, ſtrains a Juice received from the *Uterine Arteries*, which being ſeparated in the Cavities of the *Sinuſes* is collected together again, and then is diſperſed through the Veſſels of another Gland contiguous to it, from whence it is received into the Extremities of Veins, and ſo tranſmitted to the *Fœtus.*

CII. *Jan.* 6, 1669, M. *Benoit Vaſſal*, Chirurgion at *Paris*, opening the Body of a Woman of 32 Years of Age, of a ſanguine Conſtitution, and a maſculine Port, found two *Matrixes.* They were ſo well diſpoſed by an extraordinary Contrivance of Nature, that the true one had conceived eleven ſeveral times, *viz.* 7 Males, and 4 Females, all born at the full Time, and all perfectly well formed: But they were at laſt followed by a Brother, yet a *Fœtus*, that was conceived in an adjunct *Uterus*, in a Place ſo little capable of Diſtention, that ſeeking Enlargement, after it had cauſed to the Mother for two Months and a half grievous Symptoms, did at laſt, being of the Age of about 3 or 4 Months, break Priſon, and found its Grave in that of its Mother, by a very great Effuſion of Blood in the whole Capacity of her *Abdomen*; which caſt the Mother into ſuch violent convulſiue Motions for 3 Days together, that ſhe died of them.

A Woman with a Double Matrix ; *by M.* Benoit Vaſſal. *n.* 48. *p.* 969.

Fig. 54.

A, A Part of the *Vagina.* *B*, The internal Orifice of the *Womb* laid open. *C*, The *Neck* of the *Womb.* *D*, The *Cavity* of the *Womb.* *E*, A *Line* dividing the *Cavity* of the *Womb.* *F*, The *Bottom* of the *Womb.* *G*, *Two Sinuſes* found in the *Bottom* of the *Womb.* *H H*, The *Thickneſs* of the *Womb.* *I I*, The *Broad Ligament*, or a Production of the *Peritonæum* of the left Side, containing within its Foldings the *Vaſa Deferentia* and *Ejaculantia.* *K*, The *Spermatick Artery.* *L*, The *Spermatick Vein.* *M*, The *Teſticle* or *Ovarium.* *N.* The *True Vas Ejaculatorium*, inſerted into the *Bottom* of the *Womb*, by a *Sinus* which is found there. *O*, Another *Vas Ejaculatorium*, which enters at the *Neck* of the *Womb*, whereby *Women* eject after *Conception.* *P*, The *Tube* of the *Womb.* *R*, The *round Ligament.* *S*, The *broad Ligament* from that Part where in this Caſe a *ſpurious Womb* is formed. *V*, The *ſpermatick Vein.* *T*, The *ſpermatick Artery.* *Y*, The *Teſticle.* *Z*, Part of the *Tube.* 2, The true *Vas Ejaculatorium* which enters the *Bottom* of the *Womb* by the abovementioned *Sinus.* 3, Another *Vas Ejaculatorium* going into the *Neck* of the

Explication of the Figure.

Womb. 4, The Part lacerated from the *Fœtus*, being increaſed in its Bulk. 5. The *Fœtus* in the Situation in which it was found involved in its *Amnios*. 6. The *Umbilical Veſſels*, 7, The *Placenta*, adhering to a certain *fleſhy Subſtance*. 8, That *fleſhy Subſtance*. 9, The *round Ligament*.

By —— ib. 2. It may be, that that which is by M. *Vaſſal* eſteemed a *ſecond Womb*, is nothing elſe but the true *Matrix* lengthened, or that which by Anatomiſts is called *Tuba Fallopii*.

A Woman Hydropical *in the external Tunick of the* Uterus; *by Mr.* Turner. *n.* 207. *p.* 20.

CIII. A Woman aged 44 and upwards, ſome time after ſhe was married, had *conceived*, (as ſhe thought) by ſome ſuppoſed Symptoms of *Pregnancy*; and, in order to her Delivery, at the Expiration of the Time of her Account, her Midwife was conſulted. Her (fancied) Pains came on, and ſhe thought herſelf very near her Labour. Her Belly was grown very big, and had gradually increaſed from the Time of her (imagined) *Conception*; but, alas! ſhe found herſelf deceived in her Expectation, and her Preparations for this Time all in vain. Her Illneſs wore off, without leaving any Prognoſtick of an approaching Birth. Thus ſhe continued, growing bigger and more indiſpoſed, and took much Phyſick, but without any Relief, thoſe whom ſhe conſulted not knowing what her Diſtemper was. At laſt, after more than three Years from the Time ſhe thought herſelf pregnant, ſhe removed into the Air, where ſhe had not continued long before ſhe languiſhed and died.

The Corpſe being laid as advantageouſly as might be, we began our *Inciſion* from the *Umbilicus* tranſverſe the *Abdomen* to the *Ilia*; and from the ſame Center another *Inciſion* direct to the *Os Pubis*. Here was now an Expectation on all Hands of ſomething rare and monſtrous, when on a ſudden one of the Diſſecters (little thinking what was ſo near) in cutting through the *Peritonæum*, accidentally thruſt his Knife too far, and immediately there aroſe a Spring, as it were of a *limpid Serum*, or *Lympha*, as clear as Water from a Fountain, riſing up a very conſiderable Height, and with great Impetuoſity. Having emptied the containing Part of its Water, which in Quantity did ſomewhat exceed two Gallons, we found its Incloſure was a thin tranſparent Membrane. And when I had turned this Membrane to the Right-ſide, I perceived underneath this outward *Tunick*, or, (as I thought) adhering to it, a more carnous Subſtance. We then divided the *Os Pubis*, and paſſed in a Probe through the *Pudenda* into the *Vagina Uteri*, and having traced it as far as it went, by looking into the *Pelvis*, and ſearching for that carnous Subſtance I have already ſpoken of, we found it to be nothing leſs than the *Uterus* itſelf; when cutting into its Body, we perceived the End of the Probe already entered into the *Cervix* or Neck thereof. So that (what ſeemed to us ſtrange) we were at length aſcertained of the Truth, and convinced that the aforeſaid Water was contained in the external Tunick of the *Womb*, whoſe great Weight had thruſt the Body thereof perfectly on one Side, and hindered an Admiſſion of Search from the *Vagina*, towards the *Fundus Uteri*, the *Cervix* thereof being kept cloſe, as in a true Conception.

One of the great Indications of this Woman's *Pregnancy*, was a Flux of a whitiſh or pallid Humour to her *Breaſts*, which ſhe could ſqueeze out at Pleaſure,

ſure, and thought it to be no other than *Milk* generated therein, in order to the Nutrition and Conſervation of a future Birth. She had likewiſe laboured the greateſt Part of the Time under a Suppreſſion of the *Menſes*, whoſe Reflux to the Breaſts, when an Alteration had been induced by its Glandules, might, as I conjecture (iſſuing from the *Papillæ* under a ſubalbid Form) be taken for *Milk*, and give Grounds of the Suſpicion that ſhe had *conceived*.

A Woman Hydropical *in her Left* Teſticle; *by Dr.* Henry Sampſon. *n.*140.*p.*1000.

CIV. This Woman was about 50 Years old; had been married, but had never born Child; had been a Widow for about 10 Years before her Death, in which Time ſhe was much oppreſſed with Grief, and her Belly, by degrees, began to ſwell; yet not much, till about 4 Years before ſhe died. In the Year 1677, at which time ſhe weighed 216 ℔, I adviſed her to the Uſe of *Cathartick Hydragogues*, and *Diureticks*; after the Uſe of which for ſome Time, ſhe weighed but 200 ℔. But ſtill the morbifick Matter was re-accumulated to the diſeaſed Part. So that reſolving to forbear further Medicines, within half a Year after ſhe weighed 250 ℔. Her Belly being, at laſt, ſo far diſtended, as to hang down, as ſhe ſat, a good way below her Knees.

Being called to open her, I put a Pipe into the Cavity of the *Abdomen*; but hereupon there iſſued only ſome Drops of *Serum*, like the White of an Egg. At another Place there ran about 20 ℔ of a browniſh Water, or *Serum*, out of the Veſicles, hereafter mentioned, being pierced. Having ſeparated the Muſcles of the *Abdomen*, I found no *Serum* or *Hydropick* Water therein, but a Heap of Bladders, of ſeveral Sizes preſented themſelves. From the greateſt whereof, being pierced, there iſſued out about 20 ℔ more, of a brown and thickiſh *Serum*, tinctured with a Sediment of the Colour of Amber. Some of the Leſſer were about the Bigneſs of a Child's Head; which yielded a ſlimy *Serum*, in Conſiſtence and Colour like the Mucilage of Quince-Seeds. Others were much leſs; ſome as Big as a Man's Fiſt, ſome as an ordinary Apple, and ſome as a Walnut. In moſt of which was contained a *Serum* like to the White of an Egg; in ſome of them, much leſs viſcous and ſomewhat white, like Starch newly boiled. At the length I perceived, that all theſe Bladders were Parts ſome way relating to the *Womb*. Wherefore having ſeparated the *Oſſa Pubis*, I took out the *Womb*, with the *Pudendum*, and Parts appendent all together. And then, amongſt other Particulars, obſerved, that the Right *Teſticle* or *Ovary* was but ſmall, white, and its Veſicles in a manner dried up; but the Left, to be ſwelled into a vaſt Bulk: The aforeſaid Bladders, in one of which were contained ſo many Pounds of Liquor, being nothing elſe originally but the *Eggs* belonging to this Left *Ovary*. Imagine you ſaw about 40 Bladders, ſome of a little Pig, others of a Hog or a Calf, and ſome of an Ox, all diſtended with Liquor, and tied, like a Reeve of Onions, all together, and you have alſo ſeen this *Ovary*. The *Teſticle* or *Ovary* itſelf, all the *Serum* being exhauſted, weighed (together with the *Womb*, which was but light) 25 ℔. Out of all the ſaid Veſicles or Bladders together, were exhauſted above 112 ℔ of *Serum*.

A Dropſy *in one of the* Ovaries *of a Woman; by Dr.* Hans Sloan. *n.* 252 *p.* 150.

CV. Mrs. *Brown*, aged about 29, of a ſanguine Complexion, had been married about 4 Years, in which time ſhe had had one Child: Her Belly ſwelled, and ſhe thought ſhe was with Child; ſhe had often great Hyſterick Fits, ſomething like thoſe of an *Epilepſy*, lying in her Fit ſometimes without Senſe or Motion, at other times with great ſcreaming and idle Talk. Theſe with proper Remedies, were removed at ſeveral times with Difficulty. Coming to be about 6 Months gone with Child (as ſhe thought) ſhe began to have ſome Doubt whether it were ſo or not, becauſe ſhe had her *Catamenia* very regularly. I was of Opinion ſhe was not with Child, and would have treated her with Steel, and Purgers of Water, as *Hydropically* diſpoſed Bodies require; but ſhe fancying ſhe felt the Child ſtir, put a Stop to that Courſe, and went on expecting the good Hour, having prepared all things for the Child (to be born) and herſelf during her Lying-in. She delayed the propoſed Method for 3 or 4 Months beyond 9, thinking ſhe had counted wrong; but at laſt ſhe was perſuaded to Medicines, and underwent a very ſtrict Courſe, as for *Hydropick* People: Her Legs did not ſwell nor pit, her Belly was unequal, and the Swelling more of the Right-ſide, ſo that the Navel was thruſt over to the Left-ſide. She had alſo Reſolving Plaiſters applied to her Belly, but all in vain, excepting that with much Anxiety, Gripes, and Trouble, ſo much Water might be evacuated, as to bring down her Belly 3 or 4 Inches. At laſt, after ſhe had conſulted other Phyſicians, and ſome Quacks, ſhe hearkenod to a *Paracenteſis*, which was propoſed by ſome; and after a ſuitable Prognoſtick, was reſolved on, and performed at ſeveral times by diſcharging great Quantities of, firſt, a limpid thick *Serum*, as Whites of Eggs, inſipid and coagulable into the like Subſtance by Heat: It came afterwards to the Colour and Conſiſtence of thin Honey, and coagulated on Evaporation. In ſome time ſhe fell into a Fever, with a great Thruſh, Hickups, and, in about 9 Days, died.

Out of her Body, when diſſected, was diſcharged ſome Buckets of the ſame watry Subſtance that had been diſcharged by the *Paracenteſis*; Part of this was floating in the *Abdomen*, but far the greater voided out of great and thick Bags, ſome of which were as large as the Stomach, others ſmaller, many of them rotted to Pieces, and all of them in the Right *Ovary* or *Teſticle*: The *Uterus*, *Tuba Fallopiana*, and every thing elſe being ſound, bating the *Omentum*, which was quite conſumed. What was very ſtrange was, that ſeveral Bags of the larger Size in this *Ovary*, contained others ſmaller within them; and thoſe which were larger were filled with a mellaginous Liquor; thoſe ſmaller, with one like Whites of Eggs. Here and there between, were *Apoſtems*, which were but ſmall, and filled with yellow Matter. The *Gall-Bladder* was full of ſeveral triangular yellow *Stones*. She was very lean all over her Body, and never had her Legs ſwell or pit; nor the Noiſe of Water on her ſtirring in Bed, till ſome ſmall time before the *Paracenteſis*; when ſhe fell into ſo great an *Orthopnæa*, that ſhe could not, unleſs erect, breath.

CVI. This

An Embryo of 4 Weeks; by Dr. Phil. Ja. Hartman. *n.* 238. *p.* 69.

CVI. This *Embryo* was from a Woman of forty Years of Age, who miſcarried, for the the third Time, *Sept.* 27, 1685. About four Weeks before that Misfortune happened to her, ſhe had her *Menſes* upon her, but the third Day before the *Abortion* ſhe was buſy in ironing and calendring of Cloaths; and the ſame Day ſhe was ſeized with a violent *Flooding*, which ſhe had formerly been ſubject to; at laſt, however, the *Placenta* came away together with the *Chorion*, *Amnios*, and *Fœtus*, in the Shape of an entire Egg, which I had leave to carry home with me, without its being handled by any Body elſe, to examine it at my Leiſure.

Explication of the Figures. Fig. 55.

Fig. 55. The external *Cotelydon* Part of the *Placenta*, by which it adheres to the *Uterus*. *a a a a*, The Size of the *Placenta*, which filled the whole *Cavity* of the *Uterus*. *b b b b*, The *Cotyledon* Part ſet round with ſmall globular *Glands*; the *round Points* in the middle of the *Glands* ſhew the gaping Mouths of the Veſſels broke off. About the Points are dug, as it were, little *Foveæ*, which likewiſe appear in the dried Preparation of it. To this ſame Part, internally were applied little *Veſicles*, diſtended with a reddiſh yellow Liquor, and theſe are expreſſed in *Fig.* 57. *c c c*, Places in which the *Blood-Veſſels* were remarkably conſpicuous.

Fig. 56. Another Part of the *Placenta* externally, by which it adheres to the *Uterus*. *A*, That Part from which the longer Veſſels that were tore off depended; where the *Placenta* was more firmly glued or connected to the *Uterus*. *B B*, The *Borders* or *Fimbriæ* of the *Placenta* becoming thin. C, A *Foramen* through which the *Chorion* and *Amnios* appeared prominent. *D D D D*, The *Globe* of the *Placenta*, which all Figures repreſent, as if it lined the whole Cavity of the *Uterus*, and the *Fœtus* was contained in it as in another little *Uterus*.

Fig. 57. The firſt internal Part of the *Placenta*, with the *Embryo*. 1, A remarkable *Veſicle* filled with very red Blood. 2, Another *Veſicle* filled with a yellow Liquor. 3, The *largeſt* of all diſtended with a yellow Liquor. 4 4 4 4, Leſſer *Veſſels* placed round the others, of various Sizes, and filled with different Fluids, red, yellow and limpid. 5, The *Umbilical Rope* with its Veſſels. 6, The *Embryo*, its Figure, Size, Situation of its Hands and Feet, its *Penis*, and Rump, the *Anus*, as if marked Black with *Meconium*, the *Helices* of the Ear, and the gaping Mouth, all very accurately delineated. 7, The Place where the Coat of the *Funis Umbilicalis* inſinuated itſelf into the *Cavities* of the *Veſicles*. 8 8 8 8 8, A Space void of *Veſicles*, where the *Chorion* and *Amnios* are connected to the Borders of the *Placenta*.

Fig. 58. Another Part of the *Placenta* internally without the *Embryo*. 1 1 1, *Veſicles* of various Sizes, and filled with Liquors of different Colours, 2, *Blood-Veſſels* running here and there upon it. 3 3 3, A Space void of *Veſicles*, ſhewing an Expanſion of the *Placenta*, with the Coat of the *Chorion* annexed to it. 4 4 4, The Borders of the *Chorion* with the thinner Part of the *Placenta* tore away. 5, A *Foramen* from the *Placenta* and *Chorion* being tore.

Fig. 59.

Fig. 59. The *Embryo*. *A*, Its plump Habit of Body. 1, A white Line dividing its *Fore-head*. 2, 3, Two other white Lines reaching to the *Coronal Suture*. 4, Two *Points* marking out the *Foramina* of the *Noſtrils*. 5, The *Helix* of the *Ear*, diſtinguiſhed by a whitiſh Line. 6. The *Penis*. 7. The *Toes* ending irregularly, with ſmall Lines pointing out the Interſtices betwixt them; and the ſame in the *Hands*. 8, The *Protuberance* of the *Rump*, with the *Foramen* of the *Anus* marked. 9, The Opening of the *Mouth*. 10, The whitiſh *Spinal Marrow*, ſending off laterally ſlender white Lines of an equal Shortneſs. 11, The *Umbilical Rope*, with the ſlender Veſſels ſhining through its Coat.

The Reſpiration and Nouriſhment of a Fœtus in Utero Materno; *by Dr.* Charles Preſton. *n.* 226. *p.* 464.

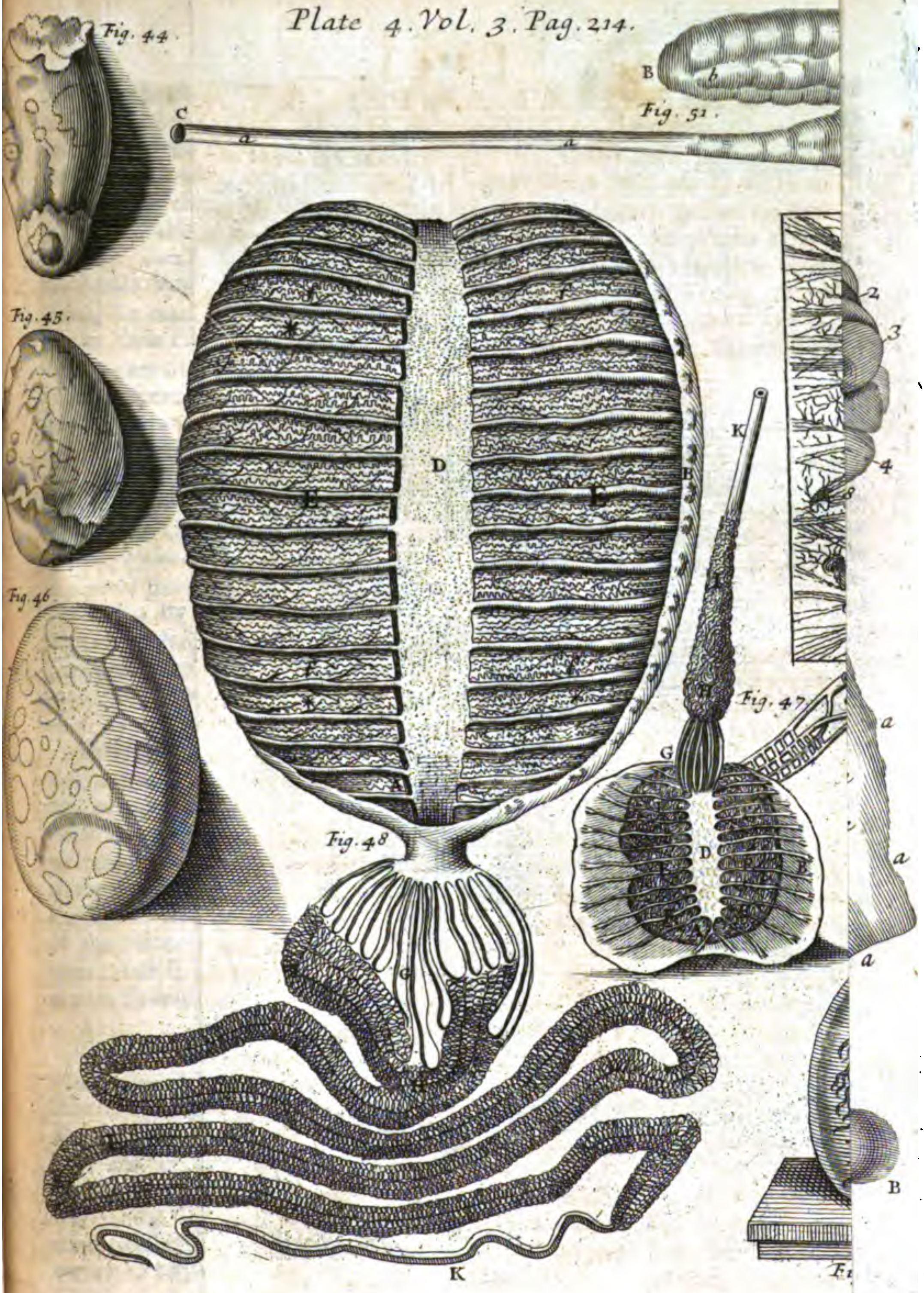
CVII. It is much controverted, Whether a *Fœtus* does *reſpire* while in *Utero Materno*, there being only a continued Circulation from the Mother to the Child, and from the Child to the Mother, by means of the *Placenta* and *Cordon*, ſo that the *Lungs* of the Mother ſerve for both, and that the Blood circulates a much ſhorter way by the *Canal* of *Communication* and *Foramen Ovale*, without paſſing the *Lungs*, than it does after the Birth, the Child having then the proper Uſe of its own *Lungs*, the former Paſſage being ſo mechanically ſtopped by a *Valvule*, that the Blood quite alters its former Channel or Courſe, as I have ſeen it, to my great Pleaſure and Satisfaction, demonſttated on ſeveral *Fœtus's* diſſected on that Account in the private Lectures of M. *du Verney*. And that the Thing may appear more clear, I ſhall mention two Opinions that obtain moſt as to the *Nouriſhment* of a *Fœtus*.

The *firſt* is, That there are a Number of *Glands* in the internal Tunick of the *Matrix*, which all the time of Child-bearing filter and ſeparate from the Blood a white Liquor, like unto *Chyle*, that is received by the *Glands* of the *Placenta*, (which is nothing but a Heap of Glands and Veſſels) that are joined with thoſe of the *Matrix*; hence in Brutes they can ſeparate the *Placenta* from the *Matrix* without the Effuſion of Blood, but only of that white Liquor, the *Umbilical* Veins and Arteries being diſtributed to all the *Glands* of the *Placenta*; ſo that the Capillary Veins receive that Liquor with the Blood, and carry it to the *Vena Porta* of the Child, and from thence to the Heart, to be diſtributed through the whole Body; and what is ſuperfluous, is carried back to the *Placenta*, by the *Umbilical* Arteries, and ſo continues to circulate from the *Placenta* to the Child, *& vice verſa*.

By the *ſecond* Opinion they pretend, That the *Umbilical* Veſſels are diſperſed through the *Placenta*, and that the Capillary Veins of the *Placenta* are *anaſtomoſed* with the Capillary Arteries of the *Matrix*, from which they receive the Blood that is carried to the Child for its *Nouriſhment*, and the Remainder is carried back by the *Umbilical* Arteries, which are *anaſtomoſed* with the Veins of the *Matrix*; ſo that the Circulation is made from the Mother to the Child, and from the Child to the Mother, by means of the *Placenta* and *Umbilical* Veſſels.

Which of theſe Opinions is the moſt probable, depends upon the Anatomy of the Parts; but any of them will ſerve my turn, *viz.* to prove there

Plate 4. Vol. 3. Pag. 214.



is a continued Circulation from the Mother to the Child, and from the Child to the Mother. And to confirm it, I ſhall produce two or three Experiments which I had occaſion to ſee performed. The firſt was on a *Fœtus*, by M. *du Verney*, where, by blowing into the *Umbilical* Vein, and tying the Arteries a little after the *Umbilical* Arteries were diſtended. The ſecond Experiment, performed alſo by M. *du Verney*, was upon the Diſſection of the *Uterus* of a Woman newly brought to Bed, by blowing into the *Hypogaſtrick* Artery, the whole Veſſels were filled, and the *Matrix* blown up; and, for a further Trial, he made an Injection, by which the Liquor came forth at the Orifices of the little Glands, which are diſperſed through the *Matrix*. This Experiment cannot be performed but only in ſuch Caſes. The third Experiment I ſaw performed by M. *Bidloo*, Profeſſor of Anatomy at *Leyden*, on a *Fœtus*, where, by an Injection of Wax into the *Umbilical* Vein, the whole Veſſels were filled, both Veins and Arteries; at which he was a little ſurpriſed, being contrary to his Doctrine. I could inſtance ſeveral other Experiments, but this is ſufficient to prove there is a continued Circulation from the Mother to the Child, and from the Child to the Mother; ſo that a *Fœtus* ſeems not to *reſpire* but by the Mother, as M. *Merey*, in the *Memoires de l'Academie de Science* has confirmed by ſeveral Experiments: The firſt was upon two Tortoiſes, by tying their Jaws ſtrongly together, and ſealing their Noſe and Throat with *Spaniſh* Wax, to try how long they could live without *breathing*: The firſt lived 31 Days, the other 32. Another Experiment was by laying open the *Sternum* of a Dog, who died a little after; but having lifted that of a Tortoiſe, it lived yet 7 Days.

Although their Reaſons ſeem to be ſtrong, that a Tortoiſe can live ſo long without *breathing*, having the *Canal of Communication* and *Foramen Ovale* always open, yet M. *Merey* pretends they are not concluding, but by other Reaſons quite different; and that is, by the continued *Circulation*, as we have ſaid above, as he has ſeveral times obſerved in *Accouchmens*: That if the *Cordon*, by which the *Fœtus* is tied to the *Placenta*, was ſo preſſed, that the Blood could not paſs from the Mother to the *Fœtus*, and that the Head of the *Fœtus* is engaged in the Paſſage, the *Fœtus* is *choaked* in a very little time; but if the Head is come forth, the *Fœtus* dies not, although the *Cordon* be ſtrongly compreſſed by the reſt of the Body.

An Egg *found in the* Tuba Fallopiana *of a Woman; by M.* Buſſiere. *n.* 207. *p.* 17.

CVIII. She was a young Woman of about five or ſix and twenty, and had lain in not long before, which I diſcovered, 1, By the *Cicatrices* of the *Scarf-Skin* of the lower *Belly* which were ſtill recent. 2. By the Tearing of the *Hymen*, which was juſt newly cicatriſed. 3. By the Largeneſs of the *Matrix*, and in ſhort by the Orifice of the *Ovarium* of the left Side, through which the *Ovum* which contained the laſt *Fœtus* was dropt, which remained ſtill pretty large, and the Lips of it ſeemed ſtill a little ſhattered. In the mean while, though ſhe had not been lain-in a long Time, whether it was owing to ſome Debauch, or perhaps imagining that if ſhe ſhould fall with Child, they would not take her Life, ſhe diverted herſelf with a Friend, or perhaps with one of the Priſoners, ſo as to conceive. But having been executed before the *Egg* impregnated with the *Male Seed*, could have Time to fall down from the *Ovarium* to the *Uterus*, when I opened her I found the *Fallopian Tube* of the left Side extraordinarly dilated towards its Extremity, and this Dilatation where it was largeſt was a little more than an Inch in Diameter, and extended a little more than an Inch and Half, diminiſhing on the Side next to the *Womb*. The Part thus dilated became crooked and embraced almoſt the whole *Ovarium*, ſticking ſo cloſe to its Membrane as not to be ſeparated from it without Force. Upon detaching it there flowed out a limpid unctuous Liquor, which ſerved in all Appearance either to relax the Membranes of the *Tube*, ſo as it might dilate itſelf ſufficiently to allow the *Egg* to paſs eaſily into the *Matrix*; or poſſibly to lubricate the *Tube*, and by that Means aſſiſt the *Egg* in its Paſſage; or perhaps for them both. I examined at firſt whether I ſhould find any Thing in the Body of the *Tube*, which could produce this Liquor; but I could obſerve nothing there of that Kind, although the *Tube* was a good deal thicker than uſual. This Thickneſs was owing to the Swelling of the *Fibres*, which were as fleſhy as thoſe of common Muſcles, which only happens in this Caſe, no doubt, in order to give them ſufficient Force and Motion, for ſqueezing the *Egg* (after it is detached) from the *Ovarium*, and puſhing it into the *Womb*. I am of Opinion then that this Liquor, which is contained in the *Tube*, comes from the *Ovarium*, and that the Fibres and ſmall *lymphatick Veſſels*, or others, which break to open a Paſſage for the impregnated *Egg*, let this Liquor run out there, ſo that although the Tearing the *Ovarium* is a Wound, and a Symptom, yet it has its Uſe, and produces Effects perhaps abſolutely neceſſary, either for the firſt Nouriſhment of the *Egg*, or to facilitate its Paſſage into the *Womb*. So well does Nature know how to improve every Thing to the beſt Advantage. What confirms me in this Opinion is, that in the Females of Brutes, from whoſe *Ovaria* ſeveral *Eggs* are broke off at a Time, this Liquor is found in a very great Quantity. I was lucky enough not long ago to find in a *Sow* the ſame Appearances as in the *Woman*, in which the *Tube* of each Side, which embraced the *Ovarium*, contained between three and four Ounces of this Liquor.

The *Tube* being detached from the *Ovarium*, and the Liquor poured out, the *Egg* was brought to view, of the Bigneſs of a Filberd, ſurrounded with Liquor, in the middle of the dilated Cavity of the *Tube*. Three Parts of the *Egg* were already out of the *Ovarium*, by the Hole which it had made there, ſo that it ſeemed hardly to be attached to it; but when I went to ſeparate it, I found it ſtill fixed by a firm Pedicle, upon which run the Blood-Veſſels to diſperſe themſelves within and upon the *Egg*. It is by theſe Veſſels that the *Fœtus* receives its Supply of Nouriſhment, not only in the *Ovarium*, but likewiſe in the *Womb*: This *Pedicle* ſerving to form the *Placenta*, (if it is not the *Placenta* itſelf already formed in the *Ovarium*) by attaching itſelf to the Body of the *Womb*. It is likewiſe by this that we muſt conceive the *Seminal Spirit* of the *Male*, to be conveyed into the Body of the *Fœtus* within the *Egg*, to give it Motion and Fruitfulneſs.

There did not appear any ſenſible Change in the *Womb* yet, excepting that there was a good deal of *Mucus* in it, which is natural enough. The *Tube* of the left Side was in its natural State, as well as the *Ovarium*, except the Orifice by which the *Egg* of the preceding *Birth* had paſſed through.

Explication of the Figure. Fig. 60.

Fig. 60. The *Womb*. *a a*, The *Body* of the *Womb*. *b b*, The *Tube* dilated embracing the *Ovarium d*. *c*, The impregnated *Egg* ſhut up in the *Tube*. *E*, The left *Ovarium*. *F*, The Hole through which the *Egg* of the preceding *Birth* had paſſed. *g*, The left *Tube*. *h*, The *Hypogaſtrick* Artery. *I I*, The *round* Ligament. *K*, The *Egg* detached from the *Ovarium*. *L*, The *Pedicle* by which it ſtill hung at the *Ovarium*.

Fig 61.

Fig. 61. The *Womb* of a *Sow*. *a a*, The *Vagina*. *b*, The *Vulva*. *c*, The *Bladder*. *d d d d*, The *Horns* of the *Womb*. *E E*, The *Trumpets*, or *Fallopian Tubes*. *F F*, The *Extremity* of the *Tubes* dilated, embracing the *Ovaria* and full of Liquor. *g*, The *Appendix* of the *Tubes*. *H H*, The *Arteries* of the *Womb*. *i i i i*, The *Eggs* as they go out of the *Ovary*. *K K*, One of the *Tubes* detached on the Side of the *Ovary*.

A Fœtus *formed in the* Ovarium; *by M.* de S. Maurice. *n*. 150. *p*. 285.

CIX. Madam *de Saint Mere* had been ſafely brought to Bed 8 times; and after having continued 5 Years without being with Child, about 3 Months before her Death ſhe ſuſpected herſelf to be fallen into that Condition again, becauſe having never failed of being very regular, and not finding herſelf ill, ſhe was more than a Month without her ordinary Relief. But whilſt in this State ſhe had a little Show, which ſcarce left her wholly during the two laſt Months of her Life, and which ſhe paſſed nevertheleſs without much Trouble, ſo that ſhe thought herſelf to be ſecure, as to the Point of her being with Child. But 22 *Apr*. 1682, after ſhe was up in the Morning, in very good Health, ſhe fell into *Faintings*, which made her loſe abſolutely her *Pulſe* from that Moment, without depriving her of her Underſtanding or Speech. About 8 o'Clock in the Evening I came to her: I found her cold, her Countenance deadiſh, and covered with a clammy and cold Sweat, having ſtill an entire Underſtanding, and her Speech ſtrong. She complained of a great *Cholick* in the Region of the Right Groin, which terminated at the Reins: This *Cholick* was ſo violent, that as I was going to touch the Place, ſhe prayed me not to preſs it, and told me, I ſhould make her fall into a *Swoon*. In a Moment after, ſhe felt all the *Prælúdiums* of an imminent *Travail*; ſhe called her Chirurgion, and died in his Arms, ſaying, *I am delivering, I am delivering*; there appearing outwardly neither Diſtillation nor Flooding, nor any Mark of this Diſorder.

M. *de la Cheſe* was made choice of to open the Body. As ſoon as he had opened the *Integuments* of the *Belly*, we ſaw in the *Epigaſtrick* Region, all the Intrails floating in Blood: I cauſed 2 ℔ to be taken forth with a Spoon, to avoid changing the Situation of the Parts; after which, ſeeing that there remained in the Right Flank a prodigious Quantity, which was coagulated, I tried myſelf to take it out with my Hand; and amongſt the firſt Clots which I drew forth, I found a little *Fœtus*, about the Bigneſs of a Thumb, and a 3d leſs in Length, all very diſtinctly formed, and in which was manifeſtly diſcovered the Sex of a Boy, but naked and without covering. Two Fingers from this Place I found the Right *Cornu* of the *Womb*; but was amazed when I found the *Teſticle* torn long-ways, and through the Middle on the Side, that it did not touch the *Tuba*, and all its Cavity full of clotted Blood. I no longer doubted but this was the Place where this Infant was formed; and I conceived, that having acquired in this Place a Growth too great to be able to fall in time; and having continued to grow there without being able to come forth, it had at length broken its Priſon, by ſtretching it. I was confirmed in this Opinion, when comparing this *Teſticle* with the Left, I found it at leaſt 4 times bigger, its Greatneſs approaching that of an Hen's Egg, and the Left being not greater than a little Cheſnut; it was all red without and within, beſides the clotted Blood that it contained; whereas the Left was pale, and full of little Grains of the Colour and Conſiſtency of yellow Tallow. I examined the *Tube* on the Right-ſide; and I could not find that this Infant had ever entred there; it was in all Things like the Left *Tube*. The *Womb* was every where without any Rent, and in State purely natural: I only obſerved, that it was a little bigger and ſofter than it is found in Women who die without being with Child. It was all, as Dr. *Harvey* has deſcribed it, in the firſt Month of *Pregnancy*: But when it was opened, I found not the leaſt Sign of *Conception*. Indeed the Veſſels of the interior Membrane appeared to me full of Blood, and varicous, as it were, which doubtleſs was the Cauſe of that little Show of Blood, as before-mentioned.

Authors ſpeak of certain *Fœtus's* found in the *Tubes*; and of others that have been found in the Cavity of the *Belly*, the *Womb* nor the *Tubes* being any way torn; but I do not think that any Perſon hitherto has been able to ſhew, that the *Conception* is made in the *Teſticle* or *Ovarium*, as it ſeems to me that the Fact which I have now related manifeſtly demonſtrates.

A Fœtus *lying without the* Uterus *in the* Belly; *by M.* Saviard. *n.* 222. *p.* 314.

CX. 1. A Woman big with Child came to *l'Hotel Dieu* to lie in of her 3d or 4th Child; and after exceſſive Pains about the *Navel* and the lower Part of the *Belly*, by the different Motions of the Child, ſhe died there, 13 *Oct.* 1696. She was quickly opened by M. *Colignon* and *Joui*, aſſiſted by the Chief Midwife Mad. *de Glue*: They found the Child dead, and not in the *Matrix*, which was whole, near it. They deferred a further Search till the next Day, and ſent for many eminent Phyſicians and Chirurgions. We then examined the Body with Attention, and found that all the Parts that compoſe the *Matrix*, both inward and outward, as alſo the *Vagina*, were very ſound: It was as big as it uſes to be in Women 10 or 12 Days after they are brought to Bed. The *Internal Orifice* was of a livid Colour, occaſioned by the ſeveral Touchings of it, both before and after Death. There was no Mark of a Cicatrice or Hole, but thoſe of the Proceſſes, called *Tubæ Fallopianæ*, which yet were hardly wide enough to admit of a Hog's Briſtle. All the Company did agree, that the Child was never conceived in the *Matrix*, and that it never had ſtayed there. The Right *Teſticle*, or *Ovary*, was very ſound, but the *Tuba* and its Fringe were rotten in the Place where it is faſtened to the Membranes of the *Peritonæum*, which formed the *Bag* in which the Child was wrapt. The Left *Teſticle* was of the Bigneſs of a Hen's Egg, full of a ſtinking *Serum*, and the Ligaments large; the *Tuba* and its Fringe were rotten. The *Bag* was placed betwixt the *Matrix* and the *ſtraight* Gut, in the Cavity which is formed by the bending of the *Os Sacrum*: The Child was on his Knees, lying towards the Right-ſide, and ſeemed to have been dead 7 or 8 Days; for the Scarf-ſkin, or *Epidermis*, did eaſily ſeparate from the Parts under it. The Child had left its *Placenta*, though ſtill faſtened to it by the *umbilical* Veſſels; and the *Placenta* being out of the *Bag*, was on the Left-ſide, whence was voided a great Quantity of Blood into the Capacity. Its Edges being brought near to one another, repreſented a Bowl, ſuch as they play at Nine-Pins with. All the Membranes that formed this *Bag*, and thoſe that encompaſſed it, were gangrened.

I believe that the Bigneſs which we obſerved in the *Matrix*, proceeded only from the Reflux of Blood, and the Spirits which carried the Nouriſhment to the *Fœtus* when it lived.

By Dr. Fern. n. 251. *p.* 121.

2. A Goldſmith's Wife, near 9 Months gone with her 5th Child, was received into the *Hotel Dieu*, 29 *Sept.* 1696. She was then about 34 Years of Age, of a tender Conſtitution, had had 4 Children before, all which had done very well; but with the preſent ſhe had been very ill, and endured a great deal of Miſery. The Midwife who examined her Body, found a conſiderable Riſing on the Right-ſide near the *Navel*, which very much reſembled a Child's Head, her Belly below that Place bearing no Proportion to that above, or to the Time of her *Pregnancy*. On the Left-ſide there was nothing ſingular. The Midwife thought ſhe felt, through the *Vagina*, a thick Membrane filled and diſtended with Water, and in it the Heel of a Child bent towards the Thigh; but ſhe could not be aſſured whether this was within the *Womb* or not, by reaſon the *inner Orifice* was drawn ſo high, under the *Os Pubis*, ſhe could not, without ſome Difficulty, touch it with the Extremity of her Finger, Upon trying ſometime after, ſhe could not diſcern any thing like the *Fœtus* ſhe had before felt. The Patient told her, That for the firſt 6 Weeks after her being with Child, ſhe had great and continual Pains, which ſhot towards the *Navel*, and terminated there, and theſe laſted till the 3d Month; that from thence to the 6th ſhe had frequent *Convulſions*, *Apoplectick* Fits, and terrible *Syncopes*, ſo that thoſe about her deſpaired of her Life; that from the 6th to the 8th Month, ſhe had enjoyed a much better Health, which in ſome meaſure had ſtrengthened both her and her Infant; that the Pains ſhe had endured ſince that time, ſeemed to be ſo many alternate *Throws* (probably proceeding from the repeated Strokes of the Child's Head in that Place where the *Teguments* were ſo thin, by reaſon of their great Extenſion, that the Hardneſs of the *Cranium* could plainly be diſcerned through them). In this Condition was this miſerable Woman when ſhe was received into that *Hoſpital*, till her Affliction increaſing, ſhe could not lie on her Side or Back, being forced to ſit in a Chair, or kneel in Bed, with her Hand reſting on her Breaſt. Theſe ſtrange and unaccountable Symptoms obliged the Midwife to conſult with the Phyſician and Maſter Chirurgion of

the Houſe, who thought it was beſt to leave the Work to Nature, and prepare the *Woman* for her *Labour*, by opening a Vein in her Foot. The Evacuation was ordered to be ſmall (in which regard was had to the Weakneſs of the Patient, and the Nicety of her Conſtitution). However, after this time the *Child* made no Efforts, and the Tumor ſubſided, there remaining only an *hydropick* Indiſpoſition, which might be perceived by the Fluctuation; and a great Quantity of Water came away for ſeveral Days from the *Orifice* of the Vein; inſomuch, that ſhe who ſeemed to have her lower Belly and Thighs extremely diſtended, was very much extenuated before her Death.

After her Deceaſe her Body was opened by M. *Jouey:* And upon the firſt Inciſion through the *Teguments*, there came away 2 or 3 Pints [of *Paris* Meaſure] of Water and Blood, and there appeared the Head of a Child naked; and when the Parts were all laid open, there was found an entire Female *Fœtus*, contained in a ſort of Cover or Bag, which at once ſerved it both for a *Womb* and Membranes. M. *Jouey* took the Child with the *Umbilical String* out of the Mother's Belly, tracing the *String* to the *Placenta*, into which it was inſerted. This laſt appeared like a great round Lump of Fleſh, and adhered ſo firmly to the *Meſentery* and *Colon* on the Left-ſide, that it could not be ſeparated from them without ſome trouble. On one ſide of this Lump was a leſſer, about the Size of a *Kidney*, which principally adhered to the *Meſentery*, and received ſeveral Branches of the *String* into it. The larger Lump was round, and the greateſt Part of it adhered to the *Bag* or Caſe which contained the Child. This Caſe or *Bag* was corrupted and mortified in part, which probably might proceed from the frequent Strokes of the *Infant*'s Head. It ſprung from the Edges of the *Tube*, or *Fimbria* of the Right *Ovary*, which was more entire than the Left, and proceeded obliquely to the Left Side, terminating at the Bottom of the *Pelvis*. In its Deſcent it ſent out a ſmall Portion between the *Womb* and the *Rectum*. This *Bag*, by compreſſing the neighbouring Parts, had gained a conſiderable Space in the abovementioned Cavity; in ſuch manner, that a great Part of the *Child's* Body was lodged at the Bottom of it, in a bended Poſture, with the Head projecting forwards, which formed the Prominence near the *Navel*. This *Bag* ſeemed to be nothing elſe than an Elongation and Diſtention of the *Tube*, and an Expanſion or Production of the *broad Ligament* on the Right Side, which was evident from its Continuity to thoſe Parts, and the Diſtribution of the *ſpermatick Veſſels*, which were larger than uſual, and paſſed from the Extremity of the *Tube* to the larger Lump. The *Womb* was entire, and in its natural State, except that it was ſomething larger than ordinary, being about the Size of that of a Woman 10 or 12 Days after her *Delivery*, and no Marks that the Child had been lodged in it.

M. *Jouey* having obſerved this, thought fit to deſiſt till ſeveral eminent Phyſicians and Chirurgions were called, and then the *Womb* being carefully diſſected, it was unanimouſly agreed, that the *Fœtus* had never been in it, [it being, as it was noted above, in the ſame State as in Women who are not with Child, except the ſmall Dilatation of its Bulk, which might ariſe from a Compreſſion of the Veſſels, and Interception of the refluent Blood, by the unnatural Poſition of the *Fœtus*.] In thruſting a long and ſlender Probe through the Right *Horn* of the *Womb*, it eaſily paſſed into the *Tube* of the ſame Side, for 3 Fingers breadth in length, but it could not be thruſt further, by reaſon of the Conſtriction of the *Tube* in that Part. The Capacity of the *Tube* could not be diſtinguiſhed, the *Parietes* of it, by their Coalition with the *Chorion* and *Amnios* of the *Child*, forming the *Bag* in which the *Child* was included, which extended from the *Tube* on the Right Side to that on the Left, and was agglutinated to the *Viſcera* of the *lower Belly*, the *Rectum*, and to the back Part of the *Womb*, as appeared by ſome Fragments remaining on thoſe Parts after the Separation.

A Fœtus *in the Right* Horn *of the* Uterus *; by Dr*. Fern. *n*. 251. *p*. 125.

CXI. In diſſecting the Body of a Woman, who ſuppoſed herſelf to be 3 Months gone with Child, I found the *Womb* very ſmall, not larger than in Virgins, and a hard Subſtance in the Right *Horn*, which being opened, appeared to be the *Skeleton* of an *Infant*, with the *Navel-String* ſmeared round with a white Matter not unlike Plaiſter.

A Woman with Child, notwithſtanding a Coaleſcence *of the* Vagina Uteri. *By* —— *n*. 237. *p*. 56.

CXII. A few Weeks ago, I was called to a Woman in Labour, who had had her Pains upon her for two Days, but without any Effect, for there was not a Drop of Blood nor Water had come away; and indeed no Wonder; for the *Vagina Uteri*, (a little above the Orifice of the *Urethra*) was as firmly grown together, and its Sides as cloſely united with one another, as if it had never been perforated. I aſked her Huſband how long it had been in this State, and he told me five Years, *viz*. from the Time of her former lying-in, when I delivered her of a difficult Birth. That it was grown ſo cloſe together I diſcovered not only by the Touch, but by the Sight. After a whole Day's Labour, from the Time that I was called, by Means of the Pains which were ſtrong and frequent, together with the Aſſiſtance of the Hand of the Midwife, the Membrane was at laſt a little opened (and if I am not miſtaken, tore) ſo as to admit one's little Finger. In order then to aſſiſt the Birth, I thought it proper to dilate this Opening by the *Speculum Matricis*, which being done a great *Hæmorrhage* immediately enſued, which weakned the unhappy Patient ſo-much, that ſhe died in ſix or ſeven Hours after ſhe was delivered of a dead Child.

Upon revolving this Caſe frequently in my Mind, how it could happen that this Woman ſhould conceive, when neither the *Member* nor *Seed* of the *Male* could approach near the *Womb*, I recollected the Opinion of the learned Dr. *Harvey*, in his Book upon *Generation*, (which from this Demonſtration I am obliged to aſſent to,) *viz*. that the *Fœtus* is not formed from the *Male Seed* conveyed into the *Uterus*, but that the whole Maſs of Blood (as if by a Kind of Infection) receiving a Plaſtick Force from the *Semen*, communicates it to the *Eggs* fallen down in the *Uterus*, whereby they are rendered fruitful: And I am the more of this Opinion, as I know that the Woman was extremely anxious to have a Child, which doubtleſs increaſed the Vigour of her Embraces with her Huſband, and it ſeems very probable, that in the Time of Coition, when ſhe was ſtrongly ſtimulated, the Animal Spirits at that Time flowing in great Abundance, attracted ſome *Effluvia* from the *Seed* of the *Male*, and communicated a Fecundity to the Maſs of Blood, and ſo to the *Eggs* contained in the *Uterus*.

Note, That notwithſtanding this Coaleſcence of the *Vagina*, ſhe had frequently had her *Menſes* before ſhe conceived.

A Child 26 *Years in the Mother's* Belly, *out of the* Uterus; *by Dr.* Bayle. *n.* 139. *p.* 979.

CXIII. 1. *Margaret Mathew*, Wife of *John Puget*, Shearman (at or near *Drolouſe*) being with Child in 1652, perceived about the End of the 9th Month of her Bearing, ſuch Pains as Women uſually have, when about to fall in Labour. Her Waters alſo broke, but no Child followed. For the Space of 20 Years, ſhe perceived this Child to ſtir, with many troubleſome Symptoms accompanying: But for the ſix laſt Years, ſhe perceived not the Child to move. She died *June* 18, 1678; and the the next Day, being opened, a dead Child was found in her *Belly*, out of the *Womb*, no way joined or faſtened to it; the Head downward; the Buttocks hanging toward the Left-ſide. All the Back-part of this Child was covered with the *Omentum*, which was about two Fingers thick, and ſtuck hard to divers Parts of the Body of it, not to be ſeparated without a Knife; which being done, very little Blood iſſued. This *Infant* weighed 8 Pounds *Averdupois*. The *Scull* was broken into ſeveral Pieces. The *Brain*, of the Colour and Conſiſtence of Ointment of Roſes. The *Fleſh* red, where the *Omentum* ſtuck, other Parts whitiſh, yellowiſh, and ſomewhat livid; except the *Tongue*, which had the natural Softneſs and Colour. All the *inward* Parts were diſcoloured with a Blackiſhneſs, except the *Heart*, which was red; and without any iſſuing Blood. The *Forehead*, *Ears*, *Eyes*, and *Noſe*, were covered with a callous Subſtance, as thick as the Breadth of a Finger. The *Gums* being cut, the *Teeth* appeared in the Adultneſs of thoſe in grown Perſons. The Body had no bad Smell, though kept 3 Days out of the Mother's Belly. The Length of the Body from the Buttocks to the Top of the Head, about 11 *Inches*. The Mother died about the 64th Year of her Age.

By—n. 140. *p.* 1001. *Vid.Sect.*CVI.

2. This Hiſtory of the *Fœtus*, and that of an *hydropick Teſticle* (mentioned above) may be two Arguments farther to ſatisfy thoſe who have hitherto doubted of the *Female Teſticle*, being an *Ovary*. The former proving the *Veſicles* thereof with the Humour or Humours they contain, to be the *Eggs* out of which the *Fœtus* is bred. Which, as they are uſed to enter into the *Womb* by the *Fallopian Tube*, ſo in this Caſe, it is moſt likely that the *Egg* falling off the *Ovary* into the ſaid *Tube*, by ſome preternatural Contraction of its lower Orifice, was ſtopped from iſſuing thence into the *Womb*: Yet being, it ſeems, near enough to receive the *Vital Contact*, it thereupon began to be enlarged; and ſo, by reaſon of its own increaſing Bulk, was made gradually to ſlip back again towards the upper and larger Orifice of the ſaid *Tube*, and at laſt to drop thence into the *Cavity* of the *Abdomen*; which now, inſtead of the *Womb*, became its *Neſt*. The latter ſheweth, that it is poſſible for the ſaid *Veſicles* or *Eggs*, to be enlarged upon Conception, as much as is neceſſary for the Generation of a

Child: That is to ſay, when within the *Womb*, as much as they were in that Caſe, upon the *Ovary*. So that it is not, I conceive, reaſonable to be doubted, but the Membranes, which we call the *Secundine* or *After-birth*, are the individual ones which belong to that *Veſicle* or *Egg* which falls from the *Ovary* into the *Womb*; being therein, with their contained Humour, naturally augmented and amplified, as there they were preternaturally in that *hydropical* Caſe.

The Bones of a Fœtus *void-ed* per Anum, *ſome Years after* Conception; *by Dr.* Ch. Morley. *n.* 227. 486.

CXIV. This Hiſtory of a preternatural Excretion of a *Fœtus*, which happened almoſt forty Years ago, I ſend you as I had it from the Relations and Acquaintance of the Woman, who is the Subject of it. In the Village called *Swaſy*, *Mary Kid*, a Woman of low Birth, but not unhandſome, when ſhe was about thirty Years of Age, after having had one Child, conceived again in the Year 1658. During the whole Time of Pregnancy, the uſual Symptoms appeared and ſucceeded one another. At length a Midwife was called, and the Labour came on, which after continuing ſome Days without producing any Effect, at laſt went quite off, but her Belly was ſtill big. The Woman, no doubt, was ſurpriſed at all this, but however ſhe returned to her uſual Work. A Year and a Half afterwards, the Swelling of her Belly remaining ſtill the ſame, the poor Woman frightned, at her uncommon Condition, tried to find Relief from this extraordinary Caſe by an extraordinary Remedy. For there was at that Time in the Town of *St. Ives*, a low ignorant Fellow, who being the Seventh Son, was born to cure all Diſeaſes. This Man there, this Treaſure of Phyſick, being called to the Woman, promiſed to relieve her, not by Means of any ungrateful Medicine, but by the Touch alone. The Woman believed him (ſo credulous are ſome People apt to be in theſe Caſes) and the Neighbours being called in, and the Smock tore away on each Side of her Belly, ſhe ſuffered him to ſtroak it down with both his Hands. After this Benediction of the *Womb*, as one may call it, he ordered her to provide herſelf with a Wooden Cheſt, and lay up in it whatever ſhould come away from the *Womb*. The Cheſt was got immediately, and about two Weeks afterwards ſhe voided a little Bone, not by the *Vagina*, but by the *Anus*, and at different Intervals afterwards ſhe voided ſeveral more. For as long as the Belly was ſwelled after the uſual Time of Geſtation, and before ſhe voided any Bones by Stool, ſo long did this voiding of Bones by Stool continue afterwards. All the Bones were laid up moſt religiouſly in this wooden Cheſt, and there was ſuch a Number of them, and ſo many different *Skulls*, that every Body thought that there muſt have been three *Fœtuſes* buried in the *Womb* all that Time. Nature however, who is the beſt Phyſician of the Sick, preſerved her ſafe thro' this tedious and troubleſome cadaverous Birth, healed up the *Abceſs* which ſhe had firſt formed for the Excluſion of the *Fœtus*, and ſo performed now the Office of a Phyſician, as ſhe had before done that of a Midwife. But her inconſiderate Raſhneſs did not allow her to enjoy long the Benefit of this Cure, for two Years afterwards riding to *Sturbridge-Fair*, near *Cambridge*, upon a high trotted Horſe, the Violence of the Motion renewed the Ulcer again, ſo that ſhe died of it.

A Fœtus *void-ed at an ulcer-ed* Navel; *by Mr.* James Brodie. *n.*229. *p.* 580.

CXV. A Negro-Woman, belonging to Capt. *Mead* in *Nevis*, about the 17th Month of her being with Child, was relieved after this Manner. Her *Navel* impoſtumated and broke of itſelf, and after it had voided ſome Quantity of *ichorous* Matter, whereby ſhe had ſome Eaſe, it left off. In about a Month more it impoſtumated again to a far greater Degree than before; whereupon, the Chirurgion being ſent for, he, where it did ſeem moſt jetting out, which was the *Navel* itſelf, did lay it open with a large Lancet; and then, after voiding a great deal of thin *Ichor* and Matter, there appeared ſome *Bones* which proved to be a *Child* that the Fleſh was decayed from, the which did ſtink much. But after the Extraction of the *Bones*, the Woman recovered: And I was told by the Chirurgion, and ſeveral others, that ſhe hath had a *Child* ſince.

The Bones of a Fœtus *voided above the* Os Pubis; *by* — *n.* 243. *p.* 292.

CXVI. *Margaret Parry*, of *Hintbery* in *Berkſhire*, in the Year 1668, was delivered of a *Child:* She continued indifferently well 2 or 3 Days after her Delivery; then new Pains came upon her, and for 3 Weeks together there came from her daily ſome Quantity of Corruption, with Pieces of Fleſh and Skin; and ſhe continued dangerouſly ill for about 8 Weeks, at the End of which Time ſhe was relieved. After 2 Years ſhe began to Breed again, had 3 Children in the 3 Years following, all which were drawn from her by *Violence*. During her *Lying-in* with the laſt of theſe 3 Children, ſome *Bones* of a *Fœtus* came from her; after this ſeveral other *Bones* came away with her *Catamenia*, and ſeveral (amongſt which were divers Parts of the *Skull*, and ſome of the larger *Bones* of the Body of a *Fœtus*) worked their Way by Degrees through the Fleſh, above the *Os Pubis*.

The Woman was alive and in Health in *Oct.* 1684. All the Children were born perfect.

A falſe Conception; by Dr. William Cole. *n.* 172. *p.* 1045.

CXVII. An old Woman of good Senſe, and unqueſtionable Veracity, formerly much converſant with Women with Child and lying-in, now in the Seventy-ninth Year of her Age (*viz.* in the Year 1670.) imagined herſelf to be with Child a good while ago, and believes it ſtill; nay, what is more ſurpriſing (and perhaps will make you laugh) ſhe fancies ſhe has carried it theſe ſeven Years laſt paſt. Happening to go that Way about Buſineſs four Years ago, and being informed of the Thing, by ſome no leſs credulous than ſhe, ſtruck with the Novelty of the Caſe, I went on purpoſe to examine it, and found her Belly much ſwelled, not in the Manner of your hydropick People, but protuberating upwards, as in the Caſe of Women with Child. As I aſked a good many Queſtions, and found that neither ſhe (nor her Huſband, who was ten Years younger than ſhe) doubted at all of her Pregnancy, I deſired to know the Reaſon why they were ſo poſitive about it. She anſwered me with ſome Reluctance, that ſhe had bore ten Children, and from that Time for the Space of eight and twenty Years the menſtrual Diſcharge was entirely ſtopt. At laſt, however, it broke out again very plentifully, after which ſhe ſoon perceived the Signs of Conception; ſhe had *Nauſeas*, frequent Vomitings, and Longings, ſuch as Women with Child commonly have, for ſeveral Months, her Belly growing gradually bigger and bigger. Afterwards, at the uſual Time, the firſt Motions of the *Fœtus* were to be felt, ſometimes in one Part, ſometimes in another, and grew more and more ſenſible, as in real Pregnancy, the Belly likewiſe increaſing in its Bulk every Day. At laſt (the uſual Time of Delivery approaching) ſhe had true Labour Pains, and was obliged to call a Midwife: But there was no Birth. However, though the Pains went off again, yet the Swelling of her Belly did not diminiſh; and the Pains frequently returning, the Midwife (who, as I have been told, was of the ſame Opinion with her Miſtreſs) was again called. From that Time ſhe affirms that ſhe felt the ſame Motion as before, but ſtill ſtronger, ſo that the By-ſtanders could eaſily ſee her Cloaths lifted up by it; the Swelling of her Belly in the mean Time a little increaſed, but not conſiderably. Her Breaſts, which I ſaw and handled, were not at all flabby, as is uſual in old Women, but full and ſwelled (though not extraordinarily) and you would feel them glandular, as is common in pregnant Women. She told me too without being aſked, that the Midwife affirmed, that the internal Orifice of the Womb was as ſoft and lax, as in any Woman that is juſt going to be delivered. When I aſked her farther, whether when ſhe was lying, in turning herſelf from the one Side to the other, ſhe felt the Weight roll accordingly? ſhe poſitively denied it, and told me I muſt not ſuſpect any Thing of a *Mole* in the Caſe; for ſhe was too well acquainted with theſe Bodies to be deceived in that Point.

After a few Days I viſited her again, and heard her repeat the ſame Story as before; I found the Breaſts too in the ſame Condition, but her Belly was a little more ſwelled, and ſhe complained much of its Tenſion. She felt the Motions ſtronger, ſhe ſaid, then before, and during the little Time that I could ſtay with her, I laid my Hands twice upon her Belly above her Cloaths, and felt the ſame Kind of Motion now in one Part and now in another, as I remember to have felt in Women that were really with Child. During all this Time of *Geſtation* (if I may be allowed with her to call it ſo) ſhe ſays ſhe has ſuffered very little for Want of Health, and has been troubled with no Symptoms, but ſuch are common to Women with Child, and ſuch as ſhe uſed to have herſelf while ſhe was bearing Children. Her Appetite and Digeſtion are both very good, ſhe is not at all droughty, as is uſual in Hydropick Patients, and the Quantity of Urine ſhe makes is in Proportion to what ſhe drinks; but ſhe makes it oftner than uſual, as Women with Child commonly do. She walks about the Houſe and Gardens very well, and without the Help of a Stick. She ſleeps moderately, but her unruly Gueſt will hardly allow her any Reſt after Day-break, but kicks her out of Bed; after which, and having eat ſomething, he allows her to ſleep again, at leaſt he is not ſo troubleſome as before. As to her Habit of Body, ſhe is fleſhy, and her Looks, in my

Opinion, do not betray any Thing morbid within. This whole Time ſhe never had any Swelling of her Feet or Legs, nor any common Symptom neither of an *Anaſarca*, an *Aſcitis*, or a *Dropſy* of the *Uterus*, excepting only the Swelling of the Belly, as far as I could learn. Nor at the ſame Time would any one who has any Regard for his Reputation, aſſert, that there muſt be a *Fœtus* contained in the Womb, ſince both her Age, and the long Time ſince the Symptoms firſt appeared, utterly contradict ſuch an abſurd Opinion.

A præternatural Conception *in* Staffordſhire; *by Mr.* Sampſon Brick. *n.* 150. *p.* 281.

CXVIII. 1. The Wife of one *Taylor*, a Taylor in *Heywood* in *Staffordſhire*, about 24 or 25 Years of Age, being married about a Year, in *Jan.* 168$\frac{2}{3}$, fell into *Travel*, and after 5 or 6 Days, the Child being dead, was brought away with fit Inſtruments: And when Mr. *Birch*'s Wife had alſo brought away the *After-birth*, ſhe perceived ſomething ſtill remaining; which ſo firmly adhered to the Womb, that it was very difficult and painful to ſeparate it, and occaſioned a large Flux of Blood.

It is further obſervable, that the *Child* was perfectly formed; that the Mother recovered; that before Marriage ſhe was never troubled with any remarkable Diſtempers; and that this *monſtrous Subſtance* was not obſerved to be included in any *Cyſtis*, the *Secundine* being all brought away before it.

By Dr. Edw. Tyſon. *ibid.* *p.* 282. *Fig.* 62.

2. I have had an Opportunity of obſerving this *preternatural Body*, and of diſcourſing Mr. *Birch* himſelf. Its *Shape* may be eaſily conceived by the *Figure*. In the uppermoſt Part thereof was a round protuberant *Bone* 3 ½ Inches in Compaſs, covered with a thick fleſhy Skin, beſet with ſhort Hairs. In the Top of this Bone in a Circle were placed 8 *Dentes Molares*, which ſo exactly reſembled *Teeth* as to their Shape, Whiteneſs, Hardneſs, and in all other Circumſtances, that they can certainly be nothing elſe. A little below this, in another Bone (which yet was faſtened to the former) were placed 5 other *Dentes Molares*, 4 of which made almoſt a ſtreight Line, but ſome Diſtance in the Middle, and the 5th was a little out of Rank, being placed below the two uppermoſt. The remaining Part compoſed a large *Cyſtis* or Bag, filled with a liquid, ſlimy Matter, but not fœtid. This *Cyſtis* on the outſide was ſmooth, appeared ſomewhat red, and was about the Thickneſs of the *Scrotum*.

A little below the Bone (in which were ſet the 8 *Teeth* before deſcribed) we obſerved a large Lock of *Hair*, of a bright brown Colour, whoſe End was intricated and intangled in a large Quantity of *Hair*, of a more faded and yellowiſh Colour, which was faſtened to the End of the *Cyſtis* oppoſite to theſe *Teeth*. But that this Lock of *Hair* was of a conſiderable Length, we eaſily gueſſed by the ſeveral ſmall Curls we obſerved in the yellowiſh Hair, which were of the ſame bright Colour with the former Lock. In the Middle of the Circle of the eight *Teeth*, I obſerved a ſmall Hole, but which did not lead far.

Vid. Sup. *Cap.* I. *Sect.* X. 4 H.

What moſt I can parallel this *monſtrous Body* with, are thoſe Inſtances of *Teeth*, *Bones* and *Hair* met with in the *Ovaria* of Women by Dr. *Sampſon* and myſelf: But our preſent Inſtance differs from them, in that this was in the *Womb*, and firmly adhering to it; the others in the *Ovarium*. In this the *Hair* was on the outſide of the *Cyſtis*, and rooted into its Tunicle; in the others it was contained within it. But as the *Child*, which was perfectly formed, and, with much Difficulty, at laſt brought from this Woman, I doubt not, at firſt, being included in the *Egg*, deſcended from the *Ovarium*; ſo likewiſe this *ſubventaneous Egg*, I queſtion not, might be tranſmitted from the ſame Place; and Nature, which is never idle, being diſappointed of forming in this a perfect *Fœtus*, made the beſt of what the Matter would afford, and might produce theſe *Teeth*, *Bones* and *Hair*, which may be reckoned as *Animal Vegetables*.

Extraordinary Effects of Strength of Imagination, *by Dr*.St.Geo. Aſh. *Bp. of* Cloyne. *n*. 228. *p*.334. *n*.243. *p*. 293.

CXIX. 1. One *Eliz. Dooly*, of the County of *Kilkenny*, was aged 13 Years in *Jan.* 168$\frac{6}{7}$. Her Mother being with Child of her, was frighted by a Cow as ſhe milked it, thrown down and hit on her left Temple, within an Eighth of an Inch from her Eye, by the Cow's Teat. This Child has exactly in that Place, a Piece of Fleſh reſembling a Cow's Teat, about 3 Inches and a Half in Length: 'Tis very red; has a Bone in the midſt about half the Length of it; it is perforated, and ſhe weeps through it; when ſhe laughs it wrinkles up, and contracts to 2 Thirds of its Length; and it grows in Proportion to the reſt of her Body. She is there as ſenſible as in any other Part.

By Dr.Cyprianus: *n*. 221. *p*. 291.

2. A Lady was lately delivered of a Girl, with a *Wound* in her Breaſt above four Fingers long; which obliquely from the Top downwards, from the *Sternum* to the left Side, ſtretched itſelf over the whole Breaſt. I found that the *Wound* penetrated to the *Muſculi Intercoſtales*, and that it was at leaſt an Inch broad, hollow under the Fleſh round about the *Wound*: Beſides that, there was a *Contuſion* with a little Swelling (red and blue, as is uſed to be in *Contuſions*) at the lower Part of the *Wound* in the Inſide. The Child came into the World without any Force; and conſequently it got not this *Wound* in its *Birth*; but it was occaſioned by Strength of *Imagination*: For about two Months before the Mother was gone to Bed, and by Chance ſhe heard a Report that a Man had murthered his Wife, and with a Knife had given her a great *Wound* in her Breaſt; at which Relation ſhe changed, but not exceſſively.

Now my Opinion is, that the Child at that very Moment that the Mother was *frighted*, received the *Wound* in its Mother's Body, becauſe that the *Wound* was very ſordid; and the Inſide, as well as the Outſide, beſet with Slime, proceeding from the Water wherein the Child is uſed to lie in its Mother's Womb, and alſo very like a *Wound* received long ſince. But after 3 or 4 Days Dreſſing the *Wound*, beginning to come to *Suppuration* and *Mundification*, began to bleed very faſt with Streams when dreſſed and wiped; and it plainly, in all its Circumſtances, was very like a freſh cut *Wound*, and being ſimply handled as ſuch, is healed up. The *Contuſion* alſo, whilſt the *Wound* was Healing, began to come to *Suppuration*, and made a Gathering, and drew down the Matter and Blood towards the Back; for the Situation of the Child was ſuch, that the Matter could not aſcend to the *Wound*, out of which Swelling, when it was opened, Matter and Blood ran, in the ſame Manner we uſed to ſee in a *Contuſion* made ſome Days. So that I judged this *Wound* wholly, even at the Birth of the Child, in that State (as I ſuppoſe it was) at that very Moment when the Mother was terrified, except that it was covered with Slime, as aboveſaid. And I ſuppoſe that this Accident remained ſo long in the ſame Condition, becauſe no Air could come to it, and the Child lay all over in Water, which has a preſerving Virtue, inſomuch that it excludes the Air.

CXX. *Papers (of leſs General Uſe) omitted.*

n. 29. p. 552. 1. The Structure of the *Epiploon*; extracted from the *Tetras Anatomicarum Epiſtolarum Marcelli Malpighii & Caroli Fracaſſati* de *Lingua* & *Cerebro*.

n. 157. p. 533. 2. Experiments relating to the *Stone*, and its Cure; propoſed by Dr. *Fred. Slare*.

n. 81. p. 4018. 3. Some late Obſervations by Dr. *Kerckringius*, concerning *Eggs* to be found in all Sorts of *Females*; extracted from his *Anthropogeniæ Ichnographia*; with ſome Reflections thereon, by M. *Denys*.

CXXI. *Accounts of Books omitted.*

n. 130. p. 768. 1. *Caſpari Bartholini, Thomæ* Filii, *Diaphragmatis* Structura nova; una cum Methodo præparandi *Viſcera*. *Paris*, 1676, in 8*vo*.

n. 44. p. 888. 2. De *Viſcerum* Structura; Exercitatio Anatomica *Marcelli Malpighii*. *Bononiæ*, 1666, in 4*to*.

n. 264. p. 610. 3. Diſſertatio Anatomico-Medica, de *Motu Bilis Circulari*, ejuſque Morbis, quam publice olim habuit *Mauritius Van Reverhorſt*, in 8*vo*.

n. 10. p. 178. n. 79. p. 3066. 4. *Regn. de Graaf*, de *Succo Pancreatico*; Exercitatio Anatomico-Medica. *Lugd. Bat.* 1671, in 12*mo*.

n. 106. p. 134. 5. De *Secretione Animali* Cogitata; Auth. *Guil. Cole*, M. D. *Oxon.* 1674, in 12*mo*.

n. 240. p. 199. 6. Traité du *Cancer*; ou l'on explique ſa Nature, & ou l'on propoſe les moyens les plus ſures pour le *Guerir* Methodiquement. Avec un Examen du Syſteme & de la Pratique de Mr. *Helvetius*, par M. *J. B. Alliot*. *Paris*, 1698, in 8*vo*.

n. 260. p. 476. 7. Recherches ſur la *Nature* & la *Gueriſon* des *Cancers*. Par M. *Deſhayes Gendron*, M. D. A *Paris*, 1700, in 8*vo*.

n. 128. p. 705. 8. Tractatus de *Ventriculo* & *Inteſtinis*; cui præmittitur alius de *Partibus Continentibus* in genere, & in ſpecie de *Partibus Abdominis*; Auth. *Franc. Gliſſonio*, M. D. *Lond.* 1676, in 4*to*.

n. 177. p. 1246. 9. *J. Con. Peyeri Merycologia*; ſive de *Ruminantibus* & *Ruminatione* Commentarius. *Baſil.* in 4*to*.

n. 263. p. 566. 10. *Petri Chirac.* Diſſertatio Academica; an *Paſſioni Iliacæ* Globuli Plumbei Hydrargyro præferendi? *Monſp.* 169, in 12*mo*.

11. *Chriſtiani a Steenvelt* Diſſertatio, de *Ulcere Verminoſo. Lugd. Bat.* 1697, in 4*o*. *Ib. p.* 570.

12. *Godefr. Bidloo* Obſervatio, de *Animalculis* in Ovino aliorumque Animantium *Hepate* detectis. *Lugd. Bat.* 1698, in 4*to*. *Ib. p.* 571.

13. *Nath. Highmori*, de *Hyſterica*, & *Hypochondriaca Paſſione*, Reſponſio Epiſtolaris ad D. *Willis*. *Lond.* 1670, in 4*to*. *n.*54. *p.* 1089.

14. Affectionum quæ dicuntur *Hyſtericæ* & *Hypochondriacæ* Pathologia Spaſmodica Vindicata, contra Reſponſion. Epiſtol. *Nathanaelis Highmori*, M. D. Cui acceſſere Exercitat. Medico-Phyſicæ duæ; 1. De *Sanguinis* Accenſione: 2. De *Motu Muſculari*. Auth. *Tho. Willis*, M. D. *Lond.* 1676, in 4*to*. *n.*57. *p.* 1178.

15. Tractatus de *Podagra* & *Hydrope*; per *Tho. Sydenham*, M. D. *Lond.* 1683. *n.* 850. *p.* 309.

16. La Lettre de *Charles Drelincourt* à M. *Porreé*, ſur la Methode, pretendue Nouvelle, de *Tailler* la *Pierre:* Avec tres autres à M. *Vallot*. A *Leide*, 1674, in 12*mo*. *n.* 107. *p.* 164.

17. *Regneri de Graaf*, M. D. Epiſtola, de nonnulis circa *Partes Genitales* Inventis novis. *Lugd. Bat.* 1668, in 16*o*. *n.* 34. *p.* 663.

18. Ejuſdem, de *Virorum* Organis *Generationi* inſervientibus, &c. *Lugd. Bat.* 1688, in 12*mo*. *n.* 38. *p.* 750.

19. Ejuſdem, de *Mulierum* Organis *Generationi* inſervientibus, Tractatus novus, *Lugd. Bat.* 1672, in 8*vo*. *n.*81. *p.*4026. *n.*82. *p.*4052.

20. *Johan. Van Horne*, M. D. Obſervationum ſuarum, circa *Partes Genitales* in utroque Sexu, Prodromus. *Lugd. Bat.* 1668, in 16*o*. *n.*24. *p.* 663.

21. *Joh. Swammerdami*, M. D. *Uteri Mulieris* Fabrica; una cum Methodo novo Cavitates Corporis ita præparandi, ut ſuam ſemper genuinam Faciem ſervent. *Lugd. Bat.* 1672, in 4*to*. *n.*84. *p.*4098.

22. Diſſertationes Medicæ tres: 1. De Cauſis *Fluxus Menſtrui* Mulierum. 2. De Sympathia variarum Corporis Partium cum *Utero*. 3. De uſu *Lactis* ad *Tabidos* reficiendos, & de immediato Corporis Alimento. Auth. *Franciſco Bayle*, M. D. *Toloſæ*, 1670, in 4*to*. *n.*64. *p.*2074.

23. *Gualteri Charletoni* Inquiſitio Phyſica, de Cauſis *Catameniorum*, & *Uteri Rheumatiſmo*, *Lond.* 1685, in 8*vo*. *n.*171. *p.*1020.

24. *Nicholai Hobokeni* Anatomia *Secundinæ Humanæ*. *Ultrajecti*. 1669, in 8*vo*. *n.* 58. *p.*1201.

25. Diſquiſitio Anatomica de *Formato Fœtu*. Auth. *Gualtero Needham*, M. D. *Lond.* in 8*vo*. *n.* 27. *p.* 506.

26. *Theodori Kerckringii*, M. D. *Anthropogeniæ* Ichnographia; ſive Conformatio *Fœtus* ab *Ovo* uſque ad *Oſſificationis* Principia, in Supplementum *Oſteogeniæ Fœtuum*. *Amſtelod.* 1671, in 4*to*. *n.*70. *p.*2136.

27. *Chriſt. Fred. Garmanni Homo* ex *Ovo*. *Chemnitii*. 1672. in 4*to*. *n.*86. *p.* 5049.

28. Of the *Formation* of *Fœtus's* by S. *Gieronymo Barlato*, Publick Profeſſor of Practical Phyſick at *Padua*. *n.* 74 *p.*2224.

29. Tractatus 5 Phyſico-Medici, de Sale, Nitro & Spiritu Nitro-Aereo; De *Reſpiratione Fœtus* in *Utero* & *Ovo*, &c. Auth. *Joh. Mayow*, LL. D. *Oxon.* 1674. in 8*vo*. *n.*105. *p.*101.

n. 125. p. 622. 30. New and curious Obſervations of the Art of curing the *Venereal Diſeaſe*, &c. Written in *French* by M. *de Blegny*; *Engliſh'd* by *Walter Harrys*, M. D. *Lond.* 1676, in 8*vo*.

n. 160. p. 620. 31. Tuta ac Efficax *Luis Venereæ*, ſæpe abſque *Mercurio*, ac ſemper ſine *Salivatione Mercuriali*, curandæ Methodus. Auth. *Dav. Abercromby*, M. D. *Lond.* 1684, in 8*vo*.

CHAP. V.

The Humours, and general Affections of the Body.

The viſible Circulation *of the* Blood; *by Mr.* Will. Molyneux. *n.* 177. *p.* 1236.

I. IN the Beginning of the Year 1683, I firſt diſcovered the *viſible Circulation* of the *Blood* in the *Water-Newt*; which, I perceive, Dr. *Garden* has ſince hit upon, and mentions in a Letter to Dr. *Middleton*, *July* 17, 1685. I frequently ſhewed it, both on the outſide without Diſſection, and in the inward Veſſels, to ſeveral curious Philoſophers; particularly *May* 26, 1684, I opened (before our *Society* at *Dublin*) a *Water-Newt*, which I take to be the *Salamandra*, or *Lacerta Aquatica*; in the Body of this Animal there are two long *Sacculi Aerei*, in which the *Blood-Veſſels* are curiouſly ramified. To theſe *Blood-Veſſels* applying a *Microſcope*, I ſhewed the *Circulation* of the *Blood*, *ad Oculum*, as plainly as Water running in a River; and more rapidly than any common Stream. The ſame Experiment I repeated again before them on the 2d of *June* following, and to thoſe that had good obſerving Eyes, the *Circulation* was as *viſible* outwardly on the Hands and Toes, as in the Veſſels within. But certainly the Appearance in the Veſſels on the two forementioned *Sacculi*, with the Beating, Emptying and Filling of the Heart, is moſt ſurpriſing.

The Quantity *of* Blood *in* Men, *and the Celerity of its* Circulation; *by Dr.* Allen Moulin. *n.* 191. *p.* 433.

II. In a Sheep, weighing alive 118 ℔. we found 5$\frac{1}{4}$ ℔. of *Blood*; which is leſs than $\frac{1}{20}$ Part of the Weight of the Sheep. In a Lamb, weighing 30$\frac{1}{2}$ ℔. when living, there was but about 1$\frac{1}{2}$ ℔. of *Blood*; which is nearly $\frac{1}{20}$ Part. In a Duck, weighing alive 2 ℔. 14 *Ounces*, 50 *Gr.* we found an Ounce and half and 53 *Gr.* of *Blood*; which is leſs than $\frac{1}{27}$ Part. In a Rabbit weighing 10 *Ounces*, 7 *Dr.* and 50 *Gr.* we found 2 *Dr.* 57 *Gr.* of *Blood*; which is about $\frac{1}{30}$ Part.

In the Right *Ventricle* and *Auricle* of the *Heart* of a Dog, I found 6 *Ounces* of *Blood*, after that I had injected into the *Jugular Vein* a Liquor that coagulated the *Blood*; I found a greater Quantity of *Blood* in the *Heart* of another Dog, whom I treated after the ſame manner. The *Hearts* were much diſtended by the *Blood* found in them. I ſhall therefore ſuppoſe that 4 *Ounces* only were received at a Time by theſe *Hearts* without Force, that is naturally. But I ſhall ſuppoſe a *Man's Heart* (though much larger, and has much larger Veſſels than thoſe I ſpeak of) to receive but 4 *Ounces* at each *Diaſtole*, and then allowing 75 Pulſes to every Minute, there will be 4500 in an Hour, and 18000 *Ounces* of *Blood* tranſmitted in that time.

Now if we ſhall ſuppoſe that a *Man's Blood* bears the ſame Proportion to his Weight, as that of any of the foreſaid Animals had to its Weight, which in a Lamb was the greateſt, being $\frac{1}{20}$ Part, it will follow that the Quantity of *circulating Blood* in a *Man* weighing 160 ℔. will not exceed 8 ℔. or 128 *Ounces*; according to which Computation the *Blood* will *circulate* 140 times in an Hour. But let us ſuppoſe, that inſtead of 8 ℔. the Maſs of *Blood* in ſuch a *Man* be 12 ℔. it will follow, that it will *circulate* between 93 and 94 times in an Hour. From this *Celerity* of the *Circulation* of the *Blood*, we may give an Account of a ſudden *Refection* with Victuals, and particularly ſuch as are liquid; we may alſo account for the quick paſſing of *Urine* from the ſame thing; and alſo the quick Motion of the *Chyle* into the *Breaſts* of *Nurſes*; without ſuppoſing unknown Paſſages, from the Stomach or any other Part, into the *Bladder* and *Breaſts*.

Anatomiſts commonly ſuppoſe no more than *Half* an *Ounce* of *Blood* to get into the *Heart* at one *Diaſtole*; and the whole Quantity of *Blood* in the Body to be between 15 and 25 ℔. by which it may appear how their Computations and mine differ.

A Method of transfuſing Blood; *by* Dr. Lower. *n.* 19. *p.* 352. *n.* 20. *p.* 353.

III. 1. Firſt, take up the *Carotidal Artery* of the Dog or other Animal, whoſe *Blood* is to be *transfuſed* into another of the ſame, or a different Kind, and ſeparate it from the *Nerve* of the 8th *Pair*, and lay it bare above an Inch. Then make a ſtrong Ligature on the upper Part of the *Artery*, not to be untied again: But an Inch below, *viz.* towards the *Heart*, make another Ligature of a running Knot, which may be looſened or faſtened as there ſhall be Occaſion. Having made theſe two Knots, draw two Threads under the *Artery* between the two Ligatures; and then open the *Artery*, and put in a Quill, and tie the *Artery* upon the Quill very faſt by thoſe two Threads, and ſtop the Quill with a Stick. After this, make bare the *Jugular Vein* in the other Dog, about an Inch and a Half long; and at each End make a Ligature with a running Knot, and in the Space betwixt the two running Knots draw under the *Vein* two Threads, as in the other: Then make an Inciſion in the *Vein*, and put into it two Quills, one into the *deſcendent* Part of the *Vein*, to receive the Blood from the other Dog, and carry it to the *Heart*; and the other Quill put into the other Part of the *Jugular Vein*, (which comes from the *Head*) out of which, the ſecond Dog's own Blood muſt run into Diſhes. Theſe two Quills being put in and tied faſt, ſtop them with a Stick, till there be Occaſion to open them.

All Things being thus prepared, faſten the Dogs on their Sides towards one another ſo conveniently, that the Quills may go into each other. After that unſtop the Quill that goes down into the firſt Dog's *Jugular Vein*, and the other Quill coming out of the other Dog's *Artery*; and by the help of two or three other Quills, put into each other, according as there ſhall be Occaſion, inſert them into one another. Then ſlip the running Knots, and immediately the *Blood* runs through the Quills, as through an *Artery*, very impetuouſly. And immediately, as the *Blood* runs into the Dog, unſtop the other Quills, coming out of the upper Part of his *Jugular Vein* (a Ligature being firſt made about his Neck, or elſe his other *Jugular Vein* being compreſſed by one's Finger) and let his own *Blood* run out at the ſame Time into Diſhes (yet not conſtantly, but according as you perceive him able to bear it) till the other Dog begin to cry, and faint, and fall into *Convulſions*, and at laſt die by his Side.

Then take out both the Quills out of the Dog's *Jugular Vein* and tie the running Knot faſt, and cut the *Vein* aſunder (which you may do without any Harm to the Dog, one *Jugular Vein* being ſufficient to convey all the *Blood* from the *Head* and upper Parts, by reaſon of a large *Anaſtomoſis*, whereby both the *Jugular Veins* meet about the *Larynx*). This done, ſew up the Skin, and diſmiſs him, and the Dog will leap from the Table, and ſhake himſelf, and run away as if nothing ailed him.

In the performing of this Experiment, theſe Circumſtances are to be obſerved. 1. That the Animals be faſtened at ſuch a convenient Diſtance, that the *Vein* os *Artery* be not ſtretched. 2. If the Pulſe fails beyond the Quill in the *Jugular Vein*, you muſt draw out the *arterial* Quill, and, with a Probe, open the Paſſage again in both of them, that the *Blood* may have its free Courſe.

By —— *n.* 20. *p.* 356.

Inſtead of a Quill, take a ſmall crooked Pipe of Silver or Braſs, ſo ſlender, that the one End may enter into a Quill; and having at the other End, that is to enter into the *Vein* and *Artery*, a ſmall Knob, and for the better faſtening them to it with a Thread; for this is much more eaſy to be managed than a Quill.

Conſiderations concerning Transfuſion *of* Blood; *by* —— *Ib. p.*35

IV. 1. It may be conſidered, in the Experiments of *Transfuſion*, that the *Blood* of the *emittent* Animal may, after a few Minutes of Time, by the *Circulation*, mix and run out with that of the *Recipient*. Wherefore, to be aſſured in theſe Trials, that all the *Blood* of the *Recipient* is run out, and none left in him but the *adventitious Blood* of the *Emittent*, two or three or more Animals may be prepared and adminiſtred, to *bleed* them all out into one.

2. It ſeems not irrational to gueſs aforehand, that the *Exchange* of *Blood* will not alter the Nature and Diſpoſition of the Animals, upon which it ſhall be practiſed; though it may be thought worth while, for Satisfaction and Certainty, to determine that Point by *Experiments*. The Caſe of *exchanging* the *Blood* of Animals, ſeems not like that of *Graffing*, where the Cyon turns the Sap of the Stock, graffed upon, into its Nature, the Fibres of the Cyons ſo ſtraining the Juice, which paſſes from the Stem to it, as thereby to change into that of the Cyons; whereas in this *Transfuſion* there ſeems to be no ſuch Percolation of the *Blood* of Animals, whereby that of the one ſhould be changed into the Nature of the other.

3. The moſt probable Uſe of this Experiment may be conjectured to be, that one Animal may live with the *Blood* of another; and, conſequently,

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that thoſe Animals that want *Blood*, or have corrupt *Blood*, may be ſupplied from others with a ſufficient Quantity, and of ſuch as is good; provided the *Transfuſion* be often repeated, by reaſon of the quick Expence that is made of the *Blood*.

Experiments of Transfuſing Blood; *by Dr.* Lower; *n.* 20. *p.* 356.

V. 1. I once *bled* a Maſtiff into a Curr, and the little Dog bled out at leaſt double the Quantity of his own *Blood*, and left the Maſtiff dead upon the Table: And after he was untied, he ran away, and ſhaked himſelf, as if he had been only thrown into Water.

The Transfuſion *of the* Blood *of a Calf into a Sheep by the* Veins *only; by Sir* Edm. King. *n.* 25. *p.* 449.

2. I took a Calf and a Sheep, both of the larger Sort, and having prepared a *Jugular Vein* in each, I planted my Pipes and Quills as is uſual, both in the *Jugular Vein* of the Calf (deſigned to be the *Emittent*) and in that of the *Sheep* (intended for the *Recipient*). Then I took out of the Sheep 49 Ounces (*Averdupois* Weight) of *Blood*, before any other *Blood* was let in; about which Time the Company concluding the Sheep to be very faint and finding the *Blood* to run very ſlowly, I ſtopped the *Vein* of the Sheep, and unſtopped the Pipe in the Calf, letting run out 10 Ounces into a Porringer, which was done in about 40″ of a Minute. Then I conveyed Pipes from the *emittent* Calf's *Vein*, into the *recipient* Sheep's *Vein*, and there ran a good free Stream of *Blood* for the Space of five Minutes (tho' perhaps leſs ſwift than the firſt 10 Ounces): And, not to be deceived in the running, I did often ſtrike with my Finger the upper Part of the *emitting Vein*, and thereby eaſily felt every Stroke anſwered on the *recipient Vein*, juſt like a Pulſe. And now ſuppoſing that by this Time (*viz.* the lapſe of 5 Minutes) the Sheep had received as much, if not more, *Blood* than it had loſt; we ſtopped the Current of *Blood* from the Calf, and cloſed alſo the *Vein* of the Sheep; and then, having untied her, and ſet her down in the Room, ſhe went about, and appeared to have as much Strength as ſhe had before the Loſs of her own *Blood*. Then reſolving to *bleed* the Sheep to Death, we bound her the 2d time, and opened the *emittent* Part of the *Vein* again; whereupon having *bled* about 60 Ounces, ſhe fell into *Convulſions*, and after the Loſs of about 5 Ounces more, ſhe died upon the Place. And being dreſſed by the Butcher, there did not, in all the uſual Places, appear above 3 Ounces of Blood; and the whole Sheep looked of a lovely white.

We reſolved alſo to ſee the Calf bleed to Death; but he having *bled* 10 Ounces, and then for the Space of 5 Minutes more into the Sheep, and reſted a good while, the *Blood* by that time began to coagulate in the *Vein*; which made me open the *Carotid Artery*, letting thence run out about 25 Ounces of *Blood*, of a very lovely and vivid Colour, vaſtly excelling therein the *Blood* of the *Vein*. The Calf, when dreſſed, had, by the Information of the Butcher, as little *Blood* as the Sheep, and we ſaw him look whiter than they uſually do in the ordinary way of killing.

3. I took out 45 Ounces and better of *Blood* out of the *Jugular Vein* of a Sheep, by which Time we found her exceeding faint. Then I conveyed *Blood* from the *Jugular Vein* of a Calf into that of the Sheep, for the

Space of 7 Minutes, when we did believe, by the Continuance of a good Stream from the Calf, that the Sheep had already received more *Blood* than ſhe had loſt. Whereupon we ſet her free, and ſhe appeared not at all concerned at what ſhe had endured in the Experiment, and continued luſty and ſtrong. We then *bled* the Calf to Death, and received from him 6 Porringers full of *Blood*, after the Sheep had been ſupplied, each Porringer contained $11\frac{1}{4}$ Ounces of Water. The Sheep loſt 4 of the ſame Meaſures full of *Blood*; which being ſupplied by that of the Calf, we reckon that the Calf loſt 10 ſuch Meaſures in all.

The Transfuſion *of the* Blood *of a mangy into a ſound* Dog; *by Mr.* Tho. Coxe. *n.* 25. *p.* 451.

4. I procured an old mungrel Curr, all over-run with the *Mange*, of a middle Size, and having ſome Hours before fed him plentifully with Cheeſe-parings and Milk, I prepared the *Jugular Vein*, as we uſe to do the *Carotidal Artery* of the *Emittent* Animal. Then I made as ſtrong a Ligature upon the Dog's Neck as I durſt, for fear of choaking him; to the End, that the *Venal Blood*, which is much more ſluggiſh in its Motion and Evacuation than the *Arterial*, might be *emitted* with the greater Advantage of *Impetus*. Then I took a young Land-Spaniel, of about the ſame Bigneſs, and prepared his *Jugular Vein*, as is uſually done in the *Recipient* Animal. Having thus prepared them both, and placed them in a convenient Poſture one to the other, I let ſlip the running Knots, and by frequent Compreſſion of the Neck (beſides the Ligature I had made) by reaſon of the tardy Running of the *Venal Blood* out of the *Emittent*, *transfuſed* about 14 or 16 Ounces of the Blood of the *infected* into the Veins of the *ſound* Dog, as near as I could gueſs by the Quantity of *Blood*, which ran into a Diſh from the *Recipient*, ſuppoſing the *recipient* Animal to loſe near about the ſame Proportion to what the *Emittent* ſupplies.

The Effect of this *Experiment* was no Alteration at all any way to be obſerved in the *ſound* Dog. But for the *mangy* Dog, he was in about 10 Days or a Fortnight's Space perfectly *cured:* Which might with Probability enough, I think, have been expected from the conſiderable *Evacuation* he made, perhaps the quickeſt and ſureſt Remedy for the *Cure* of that Sort of Diſeaſe he was infected with, both in Man and Beaſt.

* *The* Tranſfuſion *of the* Blood *of a young into an old Dog; by M.* Gayant. *n.* 26. *p.* 479.

5. Mr. *Gayant transfuſed* the *Blood* of a * *young Dog* into the *Veins* of an *old*, which, two Hours after, did leap and friſk; whereas he was almoſt blind with Age, and could hardly ſtir before.

† *The* Tranſfuſion *of the* Blood *of Calves into Dogs; by M.* Denis. *n.* 25. *p.* 453.

6. Since the 9th of *March*, 166$\frac{6}{7}$, we have *transfuſed* the *Blood* of 3 † Calves into 3 Dogs: After which the Dogs (all of them) did eat as well as before; and one of the 3 Dogs, from which ſo much *Blood* had been drawn the Day before, that he could hardly ſtir any more, having been ſupplied the next Morning with the *Blood* of a Calf, recovered inſtantly his Strength, and ſhewed a ſurpriſing Vigour.

A very plentiful Transfuſion *experimented upon a Bitch; by* —— *n.* 28. *p.* 521.

7. Several ſucceſsful Experiments have been made in *London*, of very plentiful *Transfuſions*; and among others (to mention a ſignal one) that upon a Bitch, which loſt in the Operation near 30 Ounces of Blood, and was recruited accordingly. This Animal does not only ſurvive to this very Day, but had another more ſevere Experiment ſoon after tried upon her, by which

her *Spleen* was cut out, without tying up the Veſſels whence that *Viſcus* was ſeparated: Since which Time ſhe took Dog (even before the *Wound* was healed up) was with Puppy, and brought forth Whelps, and remains well and jocund. So that it is not too haſtily to be concluded, that large *Tranſfuſions* are dangerous.

8. M. *Denys* writes from *Paris*, that they had lately *tranſmitted* the *Blood* of 4 Wethers into a Horſe of 26 Years old, and that this Horſe had thence received much Strength, and more than ordinary Stomach.

The Transfuſion *of the* Blood *of four Wethers into an Horſe; by M.* Denys. *n.* 30. *p.* 559.

9. *May* 8, 1677, at S. *Caſſini*'s in *Bononia*, there was opened the *Carotid Artery* of a * Lamb, when the *Blood* was let run as long as it could into the Right Branch of the *Jugular Vein* of another Lamb, from which there had before been drawn ſo much *Blood* as was judged it could be ſupplied with from a Lamb of the like Bigneſs, whoſe *Blood* ſhould be let out till it died. After this there was made two Ligatures pretty near to one another, in the *Vein* or the Lamb that had received the *Blood*; and this *Vein* was quite cut through between the two Ligatures. This done, the Lamb was untied, and went about without any appearance of Feebleneſs; and its Wound being healed up, it grew like other Lambs. But on the 5th of *Jan.* 1678, it died, and its *Stomach* was found full of *corrupt Food.* Its Neck being diſſected, to ſee what had happened to the *Vein* cut through, it was found that it had joined itſelf to the next Muſcle by ſome Fibres, and that the upper Part of that *Vein* had a Communication with the lower, by the Means of a little Branch, which might in ſome manner ſupply the Defects of the whole Trunk.

**The* Tranſfuſion *of the* Blood *of one Lamb into another; by* S.—— *n.* 42. *p.* 840.

10. *May* 20, 1668, at S. *Griffoni*'s, at *Udine*, the *Blood* of a Lamb was *tranſfuſed* into the *Veins* of a Spaniel of a middle Size of that Kind, 13 Years old, who had been altogether deaf for above 3 Years, ſo as what Noiſe ſoever was made, he gave not any Sign of hearing it. He walked very little, and was ſo feeble, that being unable to lift up his Feet, all he did was to trail his Body forward. After the *Tranſfuſion* practiſed upon him, he remained for an Hour upon the Table, where he was yet untied; but afterwards leaping down, he went to find his Maſters that were in other Chambers. Two Days after he went abroad, and ran up and down the Streets with other Dogs, without trailing his Feet, as he did before. His Stomach alſo returned to him, and he began to eat more, and more greedily than before. But that which is more ſurprizing is, that from that Time he gave Signs that he began to hear, returning ſometimes at the Voice of his Maſters. The 13th of *June* he was almoſt quite cured of his Deafneſs, and he appeared, without Compariſon more jocund than he was before the *Operation*. At length, the 20th of the ſame Month, he had wholly recovered his Hearing; yet thus, that when he was call'd he turned back, as if he that had called him had been very far off: But that happened not always; in the mean time he heard always when he was called.

The Transfuſion *of the* Blood *of a Lamb into a Spaniel; by* S.—— *n.* 42. *p.* 841.

VI. I think, that a Silver Tube with a Silver Stopper, ſomewhat blunted at one End, and flatted at the other, for conveniency of handling, uſed already upon Beaſts with good Succeſs, is very proper for the *Tranſfuſion* of *Blood*

A Method of transfuſing Blood *into the* Veins *of* Men; *by Sir* Edm. King. *n.* 28. *p.* 52

into the *Veins* of *Men*. The Operation may be thus performed: After the *Artery* is prepared in a *Lamb*, a *Kid*, *&c.* let a Ligature be made upon the *Arm*, *&c.* of a Man (hard enough to render the *Vein* turgid) in the Place you intend to inſert the leſſer End of the Silver Pipe; which is ſo fitted, that the Silver Stopper, thruſt into the Tube, reaches ſomewhat, by its blunt End, beyond one of the Ends of that Tube. This done, divide the Skin of the Part in the ſame Manner that is uſed in cutting an Iſſue, juſt over the *Vein* to be opened. Then, with a fine Lancet, open the *Vein*; or if you pleaſe, in caſe the *Vein* lie fair and high (eſpecially if the Skin be fine) you may open both together, according to the uſual Way of *letting Blood*. Which done, let an Aſſiſtant clap his Finger, or a little Boulſter prepared before-hand, or the like, upon the *Vein*, a little below the Orifice, to hinder the *Blood* from aſcending. Keeping that Poſition, inſert the blunt-ended Tube upwards into the *Vein*; when it is in, hold it and the Skin cloſe together between your Finger and Thumb. Then pull out of the Tube the Stopper, and inſert the Pipe by which the *arterial Blood* is to be *infuſed* from the *emittent* Animal; managing the Remainder according to the known Method of this Experiment.

Transfuſion *practiſed upon a* Man *in* London; *by Dr*, Richard Lower *and Sir* Edmund King. *n.* 30. *p.* 557. Vid. *Sup. Sect.* VI.

VII. The Experiment of *transfuſing Blood* into an human *Vein*, was performed upon Mr. *Arthur Coga*, *Nov.* 23, 1667, after this Manner: Having prepared the *Carotid Artery* in a young Sheep, we made an Inciſion in the *Vein*, obſerving the Method abovementioned, without any Alteration but in the Shape of one of our Pipes; which we found more convenient for our Purpoſe. And having opened the *Vein* in the *Man's* Arm, with as much eaſe as in the common Way of *Venæ-Section*, we let thence run out 6 or 7 *Ounces* of *Blood*. Then we planted our Silver Pipe into the ſaid Inciſion, and inſerted Quills between the two Pipes, already advanced in the two Subjects, to convey the *arterial Blood* from the Sheep into the *Vein* of the *Man*. The *Blood* ran freely into the *Man's Vein* for the Space of two Minutes at leaſt; ſo that we could feel a *Pulſe* in the ſaid *Vein* juſt beyond the End of the Silver Pipe. The *Patient* ſaid, he did not feel the *Blood hot* (as was reported of the Subject in the *French Experiment*) which may very well be imputed to the Length of the Pipes through which the *Blood* paſſed, loſing thereby ſo much of the *Heat*, as to come into a Temper very agreeable to *venal Blood*. That the *Blood* did run all the Time of thoſe two *Minutes*, we conclude from thence; *Firſt*, becauſe we felt a *Pulſe* during that Time; *Secondly*, becauſe when, upon the *Man's* ſaying, he thought he had enough, we drew the Pipe out of the *Vein*, the Sheep's *Blood* ran through it with a full Stream; which it had not done, if there had been any Stop before in the Space of thoſe two *Minutes*, the *Blood* being ſo very apt to *coagulate* in the Pipes upon the leaſt Stop, eſpecially the Pipes being as long as three Quills. From the Quantity of Blood, which ran through the Pipe into a Porringer, we judged that about 9 or 10 *Ounces* was received into the *Man's Veins*. The *Man* after the *Operation*, as well as in it, found himſelf *very well*.

VIII. 1.

The Effects of ſeveral Liquors mixed with the Blood *warm from the Veins; by Mr.* Rob. Boyle. *n.* 29. *p.* 551.

VIII. 1. In the Year 1664, I mentioned to the *Royal Society* an odd Experiment I had formerly made upon *Blood* yet warm, as it came from the Animal, *viz.* that by putting into it a little *Aqua-fortis*, or *Oil* of *Vitriol*, or *Spirit* of *Salt* (theſe being the moſt uſual *acid Menſtruums*) the *Blood* not only would preſently loſe its pure Colour, and become of a dirty one, but in a trice be alſo *coagulated*; whereas, if ſome fine *urinous Spirit*, abounding in *volatile Salt*, ſuch as the *Spirit* of *Sal Armoniack*, were mingled with the warm *Blood*, it would not only not curdle it, or imbaſe its Colour, but make it look rather more *florid* than before, and both keep it *fluid*, and preſerve it from Putrefaction for a long time. This Experiment I deviſed, among other things, to ſhew the Amicableneſs of *volatile Spirits* with the *Blood*.

By Mr. Oldenburg. *ib.*

2. This Experiment was publickly related by Mr. *Boyle* to the *Royal Society* in *Dec.* 1664, as appears by their *Journals*.

Liquor *injected into the Veins of Dogs; by* S. Fracaſſati, *n.* 27. *p.* 490. *Aqua-fortis.*

IX. 1. *S. Fracaſſati*, Profeſſor of *Anatomy* at *Piſa* in *Italy*, having *infuſed* into the *Jugular* and *Crural Vein* of a Dog ſome *Aqua-fortis* diluted, the Animal died preſently; and being opened, all the *Blood* in the Veſſels was *fixed*, but that in the Guts not ſo well. It was alſo obſerved, that the great Veſſels were burſt, perhaps by an Effort of Nature; even, as in the greateſt Part of thoſe that die of an *Apoplexy*, the Veſſels of the *Lungs* are found broken. Upon which Experiment the Author maketh theſe Reflections: *Firſt*, That an *Apoplexy* being often cauſed by a like *Coagulation* of the *Blood* (as hath been obſerved by the Opening made of ſundry Perſons who died of that Diſtemper) it might be cured by a timely *infuſing* ſome *Diſſolvent* into the *Veins*. *Secondly*, That it is likely, that that uſeful Secret, by which M. *de Bills* diſſected Animals without any *Effuſion* of *Blood*, conſiſts in ſome ſuch *Infuſion*.

Spirit of Vitriol.

2. There was afterwards *infuſed* into another Dog ſome *Spirit* of *Vitriol* which had not ſo preſent an Effect; for the Animal complained a great while, and foamed like *Epilepticks*, and had its *Reſpiration* very thick; and obſerving the Beating of his Breaſt, one might eaſily judge the Dog ſuffered much; who dying at laſt, his *Blood* was found *fixed* in the *Veins*, and grumous, reſembling Soot.

Oil of Sulphur.

3. Then there was *injected* into a Dog ſome *Oil* of *Sulphur*: But he died not of it, though this *Infuſion* was ſeveral times tried upon him. And the Wound being cloſed, and the Dog let go, he went into all the Corners of the Room ſearching for Meat, and having found ſome Bones, he fell a gnawing of them with a ſtrange Avidity, as if this *Liquor* had cauſed in him a great *Appetite*.

Oil of Tartar.

4. Another Dog, into whoſe *Veins* ſome *Oil* of *Tartar* was *injected*, did not eſcape ſo well: For he complained much, and was altogether ſwoln, and then died. Being opened, the Spectators were ſurprized to find his *Blood* not *curdled*, but on the contrary more *thin* and *florid* than ordinary; which ſeems to hint, that too great *Fluidity* of the *Blood*, as well as its *Coagulation*, may cauſe Death.

Mercury injected *into the* Veins *of Dogs*; *by Dr.* A. Moulin. n. 192, p. 186.

X. 1. In *Autumn*, 1690, I *injected* into the *Jugular Vein* of a Dog, about $\frac{1}{2}$ an *Ounce* of crude *Mercury*, and obſerved the Dog ſoon after to have a dry ſhort *Cough*, which by Intervals ſeized him. About two Days after I found him troubled with a great Difficulty of *Breathing*, and making a Noiſe like that of a *broken-winded* Horſe: There was no Tumour about the Root of his Tongue, nor any Swelling in the *Maxillary* or *Parotide Glandules*, neither was he obſerved to drivel, though I ordered him warm Broth in Expectation of a *Salivation*. The 4th Day after the *Injection* of the *Mercury* he died, being for the 2 Days before ſo troubled with an *Orthopnœa*, that he could ſleep only when he leaned his Head againſt ſomething. I opened him, and found about a Pint of *bloody Serum* extravaſated in the *Thorax*. I found alſo the Outſide of the *Lungs* in moſt Places *bliſtered* (for what I at firſt took to be ſome preternatural Dilatation of the *Veſiculæ* of the *Bronchiæ*, were only *Bliſters*, or a Separation of the common Integuments of the *Lungs* from their Subſtance.) Some of theſe were larger than a Rouncival-pea, others were ſmaller; but moſt of them contained *mercurial* Globules, to be ſeen, even without opening, in ſeveral of them through the outward Skin. Several of them I found broken, and, upon a little Preſſure, obſerved the *Mercury* to run out, and with it a little *Sanies*; but upon a pretty ſtrong Preſſure, I obſerved that a great Quantity of that *Sanies* iſſued out. When I opened the right *Ventricle* of the *Heart*, I found ſome Particles of the *Quick-ſilver* in the very midſt of the *coagulated Blood* lodged there; and in that alſo, contained in the *Arteria Pulmonalis*. I obſerved moreover *Blood*, *coagulated* after a very different Manner (which I want Words to expreſs) from what I have ſeen at any other time, notwithſtanding the various Methods I had uſed to *coagulate* it, and this in the Interſtices between the *Columnæ* of the aforeſaid *Ventricle*; and in this a greater Quantity of *Quick-ſilver* than any where elſe in the Dog. This *Coagulum* was in the *Vertex* of the *Ventricle*, adhering pretty cloſely to the *Columnæ* and *Parietes*. Opening the left *Ventricle*, I found a very tenacious *Blood*, *coagulated* and ſticking firmly to the great *Valva*, including the Tendons of it, and a little reſembling a *Polypus*. In this *Ventricle* I ſearched diligently for *Mercury*, but found none; whence it may appear, that the *Mercury* paſſed no farther than the Extremities of the *Arteria Pulmonalis*. This occaſioned the aforeſaid *Bliſters*, and forced its Way through the common Coat of the *Lungs*. I alſo opened the *Aſpera Arteria* down to the very *Bronchiæ*, but could find no *Mercury* in it, though I ſearched diligently for it. Each of the Subdiviſions, as well as Diviſions, of the *Bronchiæ* was filled with a *Sanies*, which when I waſhed away, I found Globules of *Mercury* in many Places under the *Bronchiæ*, and upon Examination they proved to be in the *Arteria Pulmonalis*. I have preſſed theſe Globules backwards and forwards, and made ſome of them get out at the Holes made in the *Veſiculæ* or *Bliſters* above deſcribed.

From hence may appear the Danger of uſing *Mercury* in human Bodies, ſo as that it may get into the *Maſs* of *Blood*, eſpecially into the *Lungs*; they wanting that briſk ſtrong Motion which the Muſcles have in other Parts, which are able to force it along with the *Blood*, in order to the raiſing a *Salivation*. Their lax ſpongy Texture makes them extreamly unfit for clearing themſelves of ſo troubleſome a Gueſt as *Mercury* is. That it has this Effect on human *Lungs*, is plain from what we daily ſee in Perſons that have been often *fluxed*, who are afterwards obſerved to die of *Conſumptions* that will not give Way to *Medicine*.

2. Diſſecting a chance Dog, that had *Mercury injected* into one of the *Jugulars* (but how long it had been in his Body I cannot tell) I found it thrown out of the *Blood* into the *Cavity* of the *Abdomen*, as likewiſe ſome Appearance of it in the other *Cavities* of the Body. All the *Glandules* were very turgid and full of Liquor, eſpecially in the *Ventricles* of the *Brain*, and all round there was a great Quantity of *Serum*. This may be called a true *Hydrocephalos*.

By Dr. Chr. Pitt. *n.* 240. *p.* 184.

XI. 1. We have *injected*, by a Syphon, about 2 *Dr*. of a *laxative* Medicine into the *Median* Vein of the right Arm of 3 Patients in the *Hoſpital* at *Dantzick*. One of the Patients was a luſty robuſt Soldier dangerouſly infected with the *Venereal Diſeaſe*, and ſuffering grievous Protuberatings of the Bones in his Arms. He, when the *purgative* Liquor was *infuſed* into him, complained of great Pains in his Elbows, and the little *Valves* of his Arms did ſwell ſo viſibly, that it was neceſſary, by a gentle Compreſſion of one's Finger, to ſtroak up that Swelling towards the Patient's Shoulders. Some 4 Hours after it began to work, not very troubleſomely, and ſo it did the next Day, inſomuch that the Man had 5 good *Stools* after it. Without any other Remedies thoſe Protuberances were gone, nor are there any Footſteps left of the above-mentioned Diſeaſe.

Medicated *Liquors* injected *into human* Veins; *by Dr.* Fabritius. *n.* 30. *p.* 564.

The two other Trials were made upon the other Sex. A married Woman of 35, and a Serving-maid of 20 Years of Age, had been both of them from their Birth very grievouſly afflicted with *Epileptick* Fits, ſo that there was little Hopes left to cure them. They both underwent this *Operation*, and there was *injected* into their *Veins* a *laxative Roſin*, diſſolved in an *Anti-epileptical* Spirit. The *firſt* of theſe had gentle *Stools* ſome Hours after the *Injection*, and the next Day; the Fits recurring now and then, but much milder, are ſince altogether vaniſhed. As for the other, *viz.* the Maid, ſhe went the ſame Day to *Stool* 4 times, and ſeveral times the next; but, by going into the Air, and taking Cold, and not obſerving any Diet, caſt herſelf away.

It is remarkable, that it was common to all three to *vomit* ſoon after the *Injection*, and that extreamly and frequently.

2. Mr. *Smith* hath adventured to open a Vein, and *infuſe* ſome *Medicines* into the *Blood* of two Perſons in the *Hoſpital* at *Dantzick*, deſperately infected with the *Pox*; whereof the one recovered, and the other died. Afterwards (*viz. July*, 1668) the ſame Phyſician, together with M. *Scheffeler*, repeated the Experiment, by *infuſing altering* Medicines into the *Veins* of the Right Arms of 3 Perſons; the one lame of the *Gout*, the other extreamly *Apoplectical*; and the 3d reduced to Extremity by that odd Diſtemper,

Medicines injected *into* Human Veins; by— *n.* 39. *p.* 766.

per, the *Plica Polonica*. The Succeſs of this, as M. *Hevelius* (who was the only Perſon admitted to be preſent at the *Operation*) informs me, was, That the *gouty* Man found himſelf pretty well next Day, and ſhortly after went to work, it being Harveſt-time, and has continued well ever ſince, leaving the *Hoſpital Aug.* 17, 1668, and profeſſing himſelf cured: The *Apoplectical* hath not had one *Paroxiſm* ſince; and the ſeveral Sores which the *Plica Polonica* had occaſioned, are healed, and both theſe Perſons are able to work.

An Obſervation upon Blood *grown* cold; *by* S. Fracaſſati. *n* 27. *p*. 492

XII. It is commonly obſerved, that when any *Blood* is become *cold* in a Diſh, that Part which is beneath the Superficies appears much blacker than that on the Top. S. *Fracaſſati* maintains, that this blackiſh Colour comes from hence, that the *Blood* which is underneath, is not expoſed to the *Air*, and not (as is vulgarly ſuppoſed) from any Mixture of *Melancholy*. To prove which, he aſſures, that upon its being expoſed to the *Air*, it changes Colour, and becomes of a *florid Red*.

Some Effects of the Air *upon* Blood, *explained by an Experiment of the* Change *of* Colour *in a clear Liquor, upon the Admiſſion of Air; by Dr.* Fred. Slare. *n*. 204. *p*. 898.

XIII. Take a Quantity of *Filings* of *Copper*, freſh made, and place them in a Glaſs Phial, whoſe Bottom is broad and even, and then pour on an *Urinous Spirit*, either of *Sal Armoniack*, or of *Urine* itſelf, not made with *Quick-Lime*. 1. The Glaſs ſhould not be filled up much above one half-way, and then muſt preſently be ſo exactly ſtopped, that no *Air* be capable of intruding. You may then obſerve for 4, 5, or 6 Days the *Tincture* will be growing deeper and deeper, and then will keep a Stand for 2 or 3 Days, more or leſs, and afterwards will gradually decline, until it become quite pale, and void of all Colour. When it is in this State, the eaſieſt Way of performing the *Experiment* for your own Satisfaction, is to decant this *clear* Spirit into a Glaſs, ſo as to leave all the *Filings* behind, and that will demonſtrate that the *Filings* did not give this *Tincture de novo*, but that it belongs to the Influence of the *Air*. But in caſe you are furniſhed with an *Air-pump*, and can pour off this *pallid* Liquor in a *Vacuo Aëris*, and there ſtop it up ſecurely, you may then preſerve it ſo long as you pleaſe, and exhibit it to Advantage. You may alſo obſerve, that ſo ſoon as you let in the *Air*, the upper Superficies immediately *tinges* firſt, and ſo deſcends deeper and deeper, until it has penetrated the Whole; and this it does the ſooner, if the Glaſs be wide, and the Liquor by conſequence have a large Superficies: Or, if you pour it out of one Glaſs into another, the *Air* makes a more ſudden *Change* of the Whole.

That this Liquor ſhould loſe its *Tincture*, is not to be wondered at, for even Ink itſelf by ſtanding ſtill will loſe much of its Tincture; and ſo do the *Tinctures* of many Minerals: Nor can we expect that there ſhould be any *Precipitation* diſcernable at the Bottom of the Glaſs, if we conſider, that 2 *Grains* of *Copper* will give a deep Colour to 3 Ounces of *Urinous* Spirit. But this is ſurpriſing, that ſince our *Menſtruum* (that is, our *Spirit*) is diveſted of its *venereal Particles* which gave the *Tincture*, and is become as *clear* as Rock-water, and being ſeparated from its Metalline *Filings*, does,

does yet, upon the Approach of the *Air*, immediately afford a very *blue Tincture.* This indeed plainly ſhews, that there muſt be concealed in the Pores of the Liquor, ſuch Particles as are of a *cupreous* Nature. But how may this come to paſs? To which I anſwer, I cannot be ſo vain to think, that the *Air* gives the Matter of the *Colour* to the *Spirit*, but that it conveys into it ſuch Particles as do ſtimulate and give Motion to the *Menſtruum*, and enable it to diſſolve thoſe Particles thoroughly, that for want of more *Air* had not been fully broken in pieces.

In the next place, I diſcover two very differing Sorts of Matter that our *urinous Menſtruum* acts upon in this *Experiment:* One I call a *ſulphureous* Matter, which gives the *blue* Colour, and does let fall again; and another, which deſerves the Name of *Saline*; but though it be taken up into our *tinging* Spirit, does yet, notwithſtanding, afford no *Tincture* whilſt ſecluded from the *Air*. This was made to me very plain and clear; for having found out a Way to ſeparate a white ſlimy Subſtance out of our clear Liqour, I then deſtroyed the *Experiment*, ſo that when expoſed to the *Air* the *Menſtruum* would no more give the leaſt *Tincture.* For a farther Confirmation, this white *ſaline* Subſtance being in a ſmall Quantity diſſolved into any proper *Urinary Menſtruum*, exhibits the *Experiment*, ſet down, to Advantage, and gives a much finer and brighter Colour than what is drawn from *crude Copper*, or from the *ſulphureous* Parts.

The great Intereſt the *Air* has in this *Experiment*, made me think of applying it to the great *Change* that is made upon *Blood:* For it is obvious to every Body, that there is a great Difference in Colour betwixt the *Venal* and *Arterial Blood*; the *Venal*, as ſoon as it is let out of the *Vein*, is obſerved to be of a dark Complection, and requires ſome Time to be expoſed to the *Air* before it obtains a *florid Red*, and that only Superficies, which is contiguous to the *Air*, does for a good while become *Red*; for I have turned up a Cake of *Blood* 24 Hours after it had been let out, and found it of a very dark and opake Colour, but the *Air* has immediately given it a bright and florid *red* Tincture. This ſo manifeſt a *Change*, made by Virtue of the *Air*, is contrary to the Opinion of thoſe Anatomiſts, who would have *Reſpiration* to be chiefly to promote the *Circulation* of the *Blood*, and that great *Apparatus* of *Air-Veſſels*, to be for a Fan to *cool* the Maſs of *Blood*; and that the *Air* returns unaltered, and not capable of making any great Alteration, being denied any Ingreſs into, or Mixture with the *Blood.* But the Obſervation is certain and unerring, that the *Venal Blood*, as it paſſes the Right *Ventricle*, at its Entrance into the *Lungs*, is of a very opake and blackiſh Complection, and in its Paſſage through the *Lungs*, before it comes to the Left *Auricle*, is *changed* into a very florid and bright *Red.* And I have often obſerved, that Perſons that have vomited *Blood*, upon a Rupture of ſome Capillary Veſſels of the *Lungs*, have ſent up a very *frothy* or ſpumous *Blood*, and at the ſame time of a bright ſcarlet *Red:* That it was frothy, argues that the *Air* had incorporated with it; that it was *red*, was due to the tinging Power of the *Air.* To expect that this *Change* ſhould be made in the *Heart* by any local Ferment, or *Flamma Vitalis*, is fruitleſs, becauſe we find it performed

formed before its Arrival there; the Structure of the *Heart* denoting that Engine to be principally made for projecting the *Blood*, in order to a *Circulation* through thoſe various *Arteries*, or Pipes, which are branched from the *Heart*. Let us therefore examine the Structure of the *Lungs*, and we ſhall ſoon diſcover it to be a *Pneumatick* Engine made principally for taking in *Air*, and that in great Quantities. It's true, we may call the *Lungs* a Contexture of *Veins*, *Arteries*, *Nerves*, *Lumphæducts*, &c. and that theſe do very much make up the *Parenchyma* (as ſome do uſe the Word) of the *Lungs*; but yet we ſhall find the great Bulk of the *Lungs* to be *veſicular:* It ſeems to me to be a Continuation of the *Aſpera Arteria*, or Wind-pipe, divided and ſubdivided into many Branches, and theſe ſtill ſpun out into leſſer and leſſer Pipes, all of them hollow; the farther they run, the thinner their Sides do grow; which, upon the *Inſpiration* of the *Air*, do ſwell up and grow round, and upon *Expiration*, do fall ſomething flaccid, and abate ſomething of that Figure, as the Microſcope does plainly repreſent.

It is therefore more than probable, that the *Air* ſhould inſinuate itſelf into this Machine, which is ſo truly adapted to receive it, and that in great Quantity; for in each *Inſpiration* the *Lungs* are ſtretched at that rate, as to take up double the Room they do in the State of *Expiration*, or in their compreſſed State; and even in this State the *Air-Bladders* are not fully evacuated, but contain *Air* for good Purpoſes. Nor can it be pretended, that any Augmentation is due to the *Expanſion* of the *Blood-Veſſels*, or any other, which do not ſwell beyond their uſual Tenſion in each *Inſpiration*. The *Sanguiferous Veſſels* are divaricated through all the *Lobes* of the *Lungs*, and do give a very cloſe Attendance to each *Veſicula* (for there is not the leaſt *Veſicula* but has a capillary Veſſel which intimately inſinuates into it) in order to receive ſome conſiderable Benefit from it: And this appears to the Eye; for in an Inſtant a dark and foul Blood is changed into a bright florid *red* Colour. Nor is the *Air* thus infuſed into the *Lungs*, for a bare Colour, and of no farther Conſideration: But I am apt to believe the great *Fermentations* of the *Blood* the Cauſe of the *Motions* and *Actions* of the *Muſcles*; the *Animal Spirits* themſelves, the great Spring of *Motions*, deriving their Energy and Powers, if not Nature, from hence. But, *Corollary* I. That the *Air* is full of *Volatile Salts*, none will deny; but that theſe *Salts* muſt bear the Name of *Nitrous Salts*, is called in queſtion by this and ſome other Experiments I have made. *Nitrous Salts* ſeem to me not to have any Property of *Volatile Salt*. *Nitre* is a Salt of ſo *fixed* a Nature, that it will continue melted in a very ſtrong Fire, with ſcarce any Evaporation; but if you put into it Charcoal or Brimſtone, or give it an Accenſion, by another *Encheireſis*, you may obtain a great Quantity of as *fixed* a *Salt* as any Concrete whatever affords; ſo that to me Gold ſeems not of a more fixed Nature.

Corol. II. A Standard of *Volatile Salts* ſhould be ſettled, at preſent I can think of none better than *Water:* That *Salt* which, in *Diſtillation*, is more *fixed* than *Water*, ought not to be reckoned among *Volatile Salts*. This Standard will be juſtified by good Meaſures, grounded on Experience: For all *Salts* that are truly *Volatile*, as far as I could obſerve, are really *lighter* than Water; that is, in a *chymical* Senſe, do with a leſs Degree of Fire *ſublime* in our Glaſſes, or come over the *Helm*, than *Water* does. This I find juſtified in our *Volatile Salt* of *Amber*, erroneouſly ſo called, for it does not come up to our Standard of *Volatility*, and is really no *Volatile Salt*; as will be made appear, if you take this ſuppoſed *Volatile Salt*, and *diſtil* it in a *Retort*, or Head and Body, with common *Water*, the *Water* will aſcend in ſuch a Degree of Fire where the *Salt* will not, for you muſt encreaſe your Fire conſiderably, to make it riſe after the *Water* is gone, and has left the dry *Salt* at the Bottom. This made me enquire farther into the Properties of the *Salt*, which did not at all correſpond with *Volatile Salts* (for all true *Volatile Salts* are *Alkalies*) but on the contrary would ferment with them, and quite deſtroy the Property of true *Volatile Salt*, by bringing them to a dull inſipid *Salt*, which ſome call *Sal Neutrum*; and alſo by fixing their Volatile Nature. not only in putting them by the Standard of *Volatility*, but alſo does quite deſtroy their ſpirituous and ſtimulating Smell, by Virtue of which they have been always deſervedly eſteemed ſuch excellent *Cephalick* Medicines. Therefore examining this *Salt* yet a little farther, you will plainly prove it to be an *Acid* that corrodes *Iron*, turns Syrup of *Gilly-flowers* green, deſtroys the Tincture of *Lignum Nephriticum*, and does not ferment with common *Acids*; ſo that it plainly belongs to the Tribe of *Acids*, and ſhould be ſtruck out of the Catalogue of *Volatile Salts*, and perhaps out of the Number of *Specifick Cephalicks*, and rather to be degraded amongſt the *Diureticks*, and even in that Rank to have but an inferior Station; for it ſeems to me to be but a dull Medicine, and more valuable for its Price than great Vertue, eſpecially if quite diveſted of all its *Oil*, in which the great *Cephalick* and *Cordial* Vertues muſt needs be owned to conſiſt.

Corol. III. That *Volatile Salts* have a great Property to draw *Tinctures*, and do particularly advance thoſe Colours that are diſpoſed to be *Red*: For though the *Spirit* of *Wine* be a very *Catholic Menſtruum*, and draws a very deep *Tincture* of *Cocheneal*, yet we have often obſerved, that if we put to this *Tincture*, when higheſt, a ſmall Proportion of *Volatile Salt*, that would advance it to a great, even a double Degree. Thus I have obſerved it to advance the *Tincture* of *Arterial Blood*, and, which is very curious, if you diſſolve it in your *Blood*, whilſt you are bleeding at one of your Veins, that *Blood* will become very *florid*, and like *Arterial Blood*. Therefore, ſince *Nitrous Salts* produce none of theſe *tinging* Effects, this *Corollary* ſeems much to favour the Notion, that the Effects of the *Air* upon the *Blood*, may be due to ſuch *Salts* as are of a *Volatile Alkaliſat* Nature.

Corol. IV. *Contagious* Diſeaſes are communicated by the *Air* inſpired at the *Lungs*; and this ſeems more probable, than what Dr. *Needham* and others have endeavoured to make out with more Difficulty, in attributing the ſame Effect to the *Air* taken in our Meat by *Maſtication*, and ſwallowed down in our Drink, and communicated to our *Chyle*, from thence to our *Blood* and *Spirits*. But this Way a very ſmall Quantity of *infected Air* is communicated, if we compare it with what is communicated to the *Lungs*: For in each *Inſpiration*,

ſpiration, human *Lungs*, of an ordinary Size, do at leaſt take in ſuch a Quantity of *Air*, as will fill up a Quart Bottle, and in the Space of a Minute I have made 12 *Reſpirations* (when I was very ſedate, and drew in my Breath very treatably) and in that Time, by Conſequence, took in as much *Air* as would fill up a Veſſel capacious enough to hold 3 Gallons of Water; and it is plain, that the *Air* expired, returns much altered, foraſmuch as the *Breath* or *Halitus* returns *impregnated* with a moiſt Vapour, and ſuch a one as does many times indicate the Temper of the *Blood*. From this *Halitus* Impoſthumations of the *Lungs* are frequently predicted: Such as have *ſulphureous Blood* ſhall emit no very pleaſing, but rancid Exhalations. Nor does the *Blood* only clear itſelf of ſome Vapours in *Expiration*, but alſo imbibe and impregnate itſelf with ſuch Particles as are neceſſary to maintain *Life* in *Inſpiration*: For a Man could not ſubſiſt long in a Tun of *Air*, ſhould he be kept cloſe in ſo capacious a Veſſel; as we have found by Experiments made with ſeveral *reſpiring* Animals, Dogs, Cats, and Birds, &c. that theſe would ſoon die there; ſo that we need conſtant Supplies of vaſt Quantities of freſh *Air*, which makes me believe, that thoſe Particles ſeparated out of the *Air* by the *Lungs* are very ſparingly delivered or mixed with the common *Air*, but yet with this Difference, that the more compreſſed the *Air* is, the more it contains of that *Vivifying Salt* or *Spirit*; and on the contrary, the more rarified, the leſs is found: For we are told by the Experience of ſuch as have been at the *Pike* of *Teneriff*, that their Breathing is more difficult there than at the Bottom, where the *Air* is more compreſſed. And we have found Birds and Mice, &c. would *live* as long again in a Veſſel where we had crouded in, by a Syringe (or any other condenſing Engine) a double Quantity of *Air*, as they did where they were confined only to common *Air*. To conclude, ſince the *Vivifying* Particles in the *Air* ſeem to be very ſparingly diſſeminated through it, I am apt to believe, that the Noxious and Peſtilential are more ſparingly ſcattered up and down (the Author of human Nature having taken more Care for its Preſervation than for its Deſtruction) and therefore it may much better be inferred from the Premiſes, that contagious *Diſeaſes* muſt needs be communicated to the *Blood* by *Inſpiration* into the *Lungs* rather than any other Way.

White Blood; *by M.*—— *n*. 6. *p*. 100.

XIV. 1. A curious Perſon writes from *Paris*, that there they had, in the Houſe of a Phyſician, newly opened a Man's Vein, wherein they found *Milk* inſtead of *Blood*.

By Dr. Lower. *Ib*. *p*. 117.

2. A Maid, after eating a good Breakfaſt about 7 in the Morning, was let Blood about 11 the ſame Day in her Foot; the firſt *Blood* was received in a Porringer, and within a little while it turned very *white*; the laſt *Blood* we received in a Sawcer, which turned *white* immediately, like the White of a Cuſtard. Within 5 or 6 Hours after I chanced to ſee both, and that in the Porringer was half *Blood* and half *Chyle*, ſwimming upon it like a *Serum*, as *white* as Milk, and that in the Sawcer all *Chyle*, without the leaſt Appearance of a Drop of *Blood*; and when we heated them diſtinctly over a gentle Fire, they both hardened, as the White of an Egg when it is heated, or juſt

as the *Serum* of *Blood* doth with heating, but far more white. This Maid was then in good Health, and only let Blood becauſe ſhe never had her *Courſes*, yet of a very florid clear Complexion.

By Dr. J. Beal. *n.* 8. *p.* 139.

3. About 20 Years ago Mr. *Thomas Day* [an Apothecary in *Cambridge*] told me, that himſelf let a Man Blood in the Arm, and the *Blood* was as *white* as Milk. As it run out of his Arm it had a little dilute *Redneſs*, but as it fell into the Veſſel it was preſently *white*; and it continued like Drops of Milk on the Pavement wherever it fell. The Conjecture which Dr. *Eade* a Phyſician there, had of this Appearance, was, that the Patient had much fed on *Fiſh*; affirming withal, that he had ſoon been a *Leper*, if not prevented by *Phyſick*.

The conſtituent *Parts of* Human Blood; *by Dr.* Raym. Vieuſſens. *n.* 241. *p.* 224.

XV. 1. After his *Majeſty* upon Account of ſome Medical Treatiſes which I publiſhed, generouſly ſettled a Penſion of a Thouſand Pounds a Year upon me; that I might not be thought unworthy of ſo great a Favour, I immediately ſet to work in order to compoſe a full and accurate Hiſtory of internal Diſeaſes. But in entering upon this Work I thought it neceſſary firſt to ſettle and demonſtrate what is the Nature and Efficacy of the conſtitutent Parts of the Blood, and further how they are proportioned to one another. I therefore bent my whole Care in examining the Blood, treading in the Footſteps of the celebrated *Boyle*, and trying, if poſſible, to puſh it ſtill farther than he had done, which I had long and often wiſhed, but durſt ſcarce hope to do it. At laſt however, by long and grevious Labour, I ſucceeded; and here I found the Miſtake of thoſe Chemiſts and Phyſicians, who hitherto believed that the *Salt*, which is commonly obtained from the *Blood*, is only merely *Acrid* or *Alkaline*, and that no *acid Salt* can by any Means be produced from it. They are likewiſe miſtaken, who for ſo many Ages paſt, have judged it impoſſible to find out by any Art the Proportion of the conſtituent Parts of the Blood to one another.

I know very well, and I own it for a Truth, that the *Salt* obtained from the *Blood* by the Force of Fire, whether it is *volatile* or *fixed*, if it is mixed with any acid Liquids even of the gentler Kinds, preſently raiſes a Fermentation, as they ſay: And beſides, that ſame Salt precipitates diſſolved *corroſive Sublimate*, and tinges the Syrup of Violets of a green Colour, as every Body knows, and therefore has a great many *ſaline-acrid* or *alkaline* Particles, whereby it produces theſe Effects; but it likewiſe contains a good many *ſaline-acid* Particles, as will appear plain from Experiments which I ſhall very ſoon mention, and thus it will be put out of all Queſtion that it is a true *ſalt Body*. When I ſay a *ſalt Body*, I mean that it is compoſed both of *ſaline-acid* and *ſaline-acrid* Particles, but the *ſaline-acrid* are in much greater Proportion; from which this Conſequence muſt be deduced, that in a natural State of the Blood, the *ſaline-acid* Particles are exceeded in Quantity by the *ſaline-acrid*, and as it were lie hid in them.

When I tried to ſeparate, if poſſible, the *acid Salt* of the *Blood*, *viz.* in the Form of an *acid Spirit*, from the *Salt* abovementioned, which I long ago divided into the *innate* and *adventitious*, or that which is ſupplied chiefly by the Aliments; I burnt, or, as they ſay, calcined, fifty Pounds of *Blood*, firſt ſufficiently baked and dried in a Braſs Veſſel over the Fire, for four and twenty Hours in a *Potter*'s Furnace, and ſo reduced the whole to 3 *Ounces* and 7 *Drachms* of a greyiſh Kind of Aſhes; and of theſe Aſhes, which were very rough to the Taſte, fermented with acid Spirits, and tinged a Tincture of the Flowers of Mallows of a green Colour, I made a *Lixive*, from which I got an Ounce of a *fixed Salt*, almoſt as white as Snow. Of that *Salt*, which, as I ſaid before, fermented with all *acid Spirits*, precipitated the diſſolved *corroſive Sublimate*, and tinged the Syrup of Violets green, I mixed 7 *Dr*. and 42 *Gr*. with about 3 *Ounces* of the drieſt *Bole*: Having mixed theſe in a Retort, luted it, and put it into a Reverberatory Furnace, I drew off Half an *Ounce* and eighteen *Grains* of *Spirit*, pretty much of the Colour of *Spirit* of *Sulphur*, and more *acid* to the Taſte than *Spirit* of *Vinegar* itſelf.

This *Spirit* ferments violently, not only with the *Oil* and fixed *Salt* of *Tartar*, but likewiſe with the *Salt* both fixed and volatile, and with the reddiſh Spirit, which are extracted from the *Blood* by the Force of Fire. Beſides, the ſame *Spirit* makes red the Syrup of Violets, the Tincture of Turnſole, and of the Flowers of Mallows. Whence it appears plain, that the *Salt* extracted from human *Blood*, ought to be looked upon as a true *Salt Body*, that is *Salt*, and ſomething of an *acrid-acid* mixed with it. That amongſt all the *Salts* it ſeems to have a perfect Reſemblance with *fixed Salt* of *Tartar* only, and none with *Sea Salt*, neither in Smell nor Taſte, nor in ſetting the Teeth on Edge, or any other of its Effects, as is demonſtrated from Experience. And hence it further appears, that the Extraction of an acid *Salt* from the human *Blood*, which has hitherto been reckoned by every Body very difficult, may nevertheleſs be done, if it is ſkilfully ſet about.

The ſame *Spirit* being extracted, and as it were forcibly drawn out of the Bowels of the fixed *Salt*, where it lay quite hid and buried, under the Form of a ſolid Body indeed, but divided into extremely minute Particles, I made a *Lixive* of what remained in the Bottom of the Veſſel, from which I got two *Drachms* and a Half, and one *Grain* of a fixed whitiſh grey *Salt*. That *Salt* did not ferment, at leaſt not ſenſibly, with any acid Liquor, except the Oil of *Vitriol*, yet it muſt be looked upon as an *acrid Salt*, or a pure, or an almoſt pure *Alkaline* at leaſt. For beſides that it had depoſited almoſt all its *ſaline-acid* Particles, it gave a green Colour to the Syrup of Violets after it had been warmed, and to the Tincture of the Flowers of Mallows, precipitated *corroſive Sublimate* diſſolved, and raiſed no Fermentation with the *Oil of Tartar*. I muſt add likewiſe, that it did not in the leaſt change the Colour of the Tincture of the *Turnſole*, which all Acids both ſolid and fluid turn conſtantly red.

Some time after I had drawn the *acid Spirit* from the fixed *Salt* of human *Blood*, I reflected upon the green Colour which the laſt Drops of the reddiſh Spirit of this Liquor put on, when I diſtilled it two Years ago from a Braſs Alembick. And indeed, in my Opinion, that green and quite leeky Colour of thoſe Drops was owing to ſome *ſaline-acid* Particles of *Vitriol* extracted by the Force of the Fire from the Braſs of the Alembick, and intimately mixed with them. When firſt I called to Mind this Circumſtance of the green Colour, I was not a little uneaſy about it, becauſe from that Accident, which I affirm really to have happened, I could ſcarce doubt but the *Blood* dried in the Braſs Veſſel, before it was burnt in the *Potter*'s Furnace, muſt have received a great many *ſaline-acid* Particles of *Vitriol*, forced from the Braſs by the Fire, which being inſeparably united with its *ſaline-acrid* Particles, might compoſe the Salt from which my *acid Spirit* was drawn.

After revolving this Affair with a good deal of Anxiety, doubting much whether an *acid Liquor* could be obtained from human *Blood*, which had no extraneous Acid combined with it, I determined to ſearch into the Truth of an Affair of ſo great Conſequence, and to find out my Miſtake, provided I was in one. I took therefore an *Ounce* of fixed *Salt*, which I had procured from human *Blood* dried in earthern Veſſels, and mixed it intimately with three *Ounces* of the drieſt *Bole*, reduced to a very fine Powder. This Mixture I threw into a Retort, covered with Clay as is uſual, then put it in the Reverberatory Furnace in my Laboratory, and having fitted a Receiver to its Neck, and carefully ſecured the joining with a wet Sow's *Bladder*, ſo that nothing could eſcape, I began firſt with a very gentle Heat, and then increaſing it by Degrees to a ſufficient Pitch, I drew off Half a *Drachm*, and ten *Grains* of *Phlegm*, and three *Drachms* of *acid Spirit* exactly reſembling the former. This *Spirit* ſet the Teeth on Edge very much, and ſeemed to my Taſte to be one of the ſtrongeſt of *Acids*, and, in ſhort, had all the Qualities which I attributed to the firſt *acid Spirit* that was drawn from the *Blood*. This happy Succeſs of my Study and Labour, which gave me a great deal of Pleaſure, intirely removed all my Doubts about the Extraction of an *acid Salt* from the *Blood*.

Afterwards I made a *Lixive* of the *Reſiduum* in the Bottom of the Veſſel, from which I extracted five *Drachms* of a whitiſh fixed *Salt*; whence it plainly appears that I had not drawn off all the *acid Spirit* I might have got from the fixed Salt, which I put into the Retort, together with the *Bole*; but I did this on Purpoſe, that the fixed Salt, whoſe Analyſis I was determined again to examine, might not be entirely deprived of all its *ſaline-acid* Particles. And I would not deprive it of all its *acid Salt*, becauſe I wanted to find out whether it differed at all from the fixed Salt, from which I drew the *acid Spirit* before, and as much as it would yield. But I could obſerve no Manner of Difference between theſe two Salts. For both of them give the ſame light green Colour to the Tincture of the Flowers of Mallows; and although they raiſe no ſenſible Fermentation, upon *Spirit* of *Nitre* or *Vitriol*, or any ſuch Liquor being poured upon them, yet they ferment violently, and both alike, upon adding a Drop or two of the *Oil* of *Vitriol* to them. From all which it is very certain, that the fixed *Salt* of the human *Blood* dried in the Braſs Veſſel, from which I extracted the *acid Spirit* at firſt, was not impregnated with any *ſaline-acid* Particles of *Vitriol*; and therefore we need not doubt, that the firſt was a true *acid Spirit* of the *Blood.*

Perhaps you will here object, that the *acrid-acid Salt*, and the *acid Spirit* drawn from the *Blood*, is not extracted from it by the Force of Fire, but is produced from the Fire itſelf as from its *Matrix*; but hear what Experience ſays upon this Subject. I have frequently by the Heat of the Sun alone, extracted from the *Blood* a reddiſh *Salt*, of a more *acrid* Taſte than that which is extracted by the Force of the Fire; which greater Acrimony is always followed by a manifeſt Acidity upon the Tongue, and the Reaſon of the firſt Phænomenon is this, that the Sun blunts the Points of that Salt much leſs than the Fire; but the laſt again is owing to the *volatile acid Salt*, by whoſe Force the *Blood* naturally ferments, being firmly combined with the *ſaline-acrid* Particles of the *Blood*, growing gradually cold when it is let out from its Veſſels. Beſides, theſe different *Salts*, thus mutually combined, are not ſo eaſily ſeparated from each other by the gentle Heat of the Sun, as by the violent Action of the Fire; and hence this *Salt*, of which I am now ſpeaking, has an *acrid-acid* Taſte, and ſcarce ferments with *acid Spirits*, if you except *Oil* of *Vitriol.*

Now I ſhall explain the Method, whereby I found out at laſt, that juſt and exact Proportion of Quantity, which Nature has given to thoſe Parts of which the Blood is compoſed. Firſt then, I examined the Blood, not of one or two Men only, but of a great many, and not only of healthy People, but of ſick, neither of the ſame, but of different, and even contrary *Temperaments*, according to the exact Rules of *Analyſis*, in ſuch a Manner, as to ſeparate the different Principles of it from one another, without any Loſs of Subſtance. One would have thought, after this, that nothing remained to be done, in order to have the reſpective Quantities of thoſe component Parts, but only to weigh them every one ſeparately; but there was ſomething more ſtill required. For the *Phlegm*, the *reddiſh Spirit*, and alſo the *fœtid Oil* carry along with them *ſaline* Particles, which it is impoſſible to ſeparate from them, and conſequently to weigh. I therefore contrived and compounded a Kind of *Phlegm*, every Way reſembling the true *Phlegm* of the *Blood*, which therefore I call natural, though extracted by the Aſſiſtance of *Chemiſtry*. I mixed, *viz.* Half a *Grain* of *Volatile Salt* extracted from human *Blood*, with twelve *Ounces* of Fountain Water diſtilled: And though theſe two Bodies bore the ſame Proportion to one another as 11525 to 1, nevertheleſs the whole Water was ſo impregnated with the *Salt*, that immediately it became a little whitiſh, and contracted ſomething of *Fœtidneſs*; being mixed too with the Syrup of Violets, after ſome Hours it made it green, and it precipitated diſſolved corroſive *Sublimate*.

Hence I could not help admiring Nature very much, for dividing Matter beyond what can be conceived; and then I had good Hopes of finding out the *Phlegm* I wanted. Nor was I deceived in my Hopes; for after having tried ſeveral Experiments in vain, I at laſt found out, that twelve *Ounces* of Spring Water, became exactly like the natural *Phlegm* of the

Blood, both in Colour, Smell, Taſte, and every other Quality, upon diſſolving in it a Grain and a Quarter of the *Salt* above-mentioned. But that I might examine ſtill more accurately the Agreement of theſe two *Phlegms*, I took exactly equal Parts of each, which I poured ſeparately to two equal Portions of the Tincture of the Flowers of Mallows, contained in two different Vials of the ſame Tranſparency, Size and Figure. Both Portions of the Tincture became immediately of a green Colour, and they were ſo like one another, that you could not obſerve the leaſt Difference between the two. After this, I took twelve *Drops* of each Portion of the *Phlegm*, and mixed with each of them twenty-four *Drops* of diſſolved *Corroſive Sublimate* contained likewiſe in two Vials of the ſame Tranſparency, Size and Figure; and preſently both Portions became of the ſame milky Colour, dropping each a white Powder exactly reſembling one another. It is as plain then, any Thing in the World can be, that no two Things can be liker one another than theſe two *Phlegms* are; wherefore, as there was only one *Grain* and a Quarter of *Volatile Salt* in twelve *Ounces* of the artificial *Phlegm*, ſo the natural *Phlegm* contained neither more nor leſs in it.

But as Nature is to be unravelled by Art, and Things that are unknown to be diſcovered by thoſe that are known, having prepared a *reddiſh Spirit* like that above deſcribed, I ſet about examining the Quantity of *Volatile Salt* in the natural *reddiſh Spirit*. After a great many repeated Experiments, Numbers of them miſgiving, I found at laſt that by mixing twenty-ſeven *Grains* of the *Volatile Salt* of the *Blood* with one *Drachm* of the *Phlegm*, there came out a Liquor in Colour, Smell, Taſte, and every other Quality, exactly like the *reddiſh Spirit* of the *Blood*, which is nothing elſe than *Phlegm* impregnated with *Volatile Salt*, and upon Account of its ſharp Particles, and a little *Sulphur* that is mixed with it, is rough and *fœtid*, and very proper to produce the Effects which I ſhall mention afterwards.

Being willing however to try the full and perfect Reſemblance in every Quality of theſe two Liquors, (the firſt of which I call the artificial, and the other the natural *reddiſh Spirit* of the *Blood*) into two equal Portions of each, contained in two drinking Glaſſes, I dropped in four *Drops* of the *Spirit* of *Vitriol*, whereby there was a Fermentation raiſed equally in each. Then into two drinking Glaſſes, of the ſame Tranſparency, Size and Figure, each of which contained twenty *Drops* of the *Tincture* of the *Flowers* of Mallows, I dropped in five Drops of each Portion of the Liquor, whereby there was immediately produced in each a very beautiful green Colour, like that of an *Emerald*, and both ſo like one another, that no Eye could obſerve the leaſt Difference betwixt them. Laſt of all, I dropt in ſix *Drops* of each of the ſame *Spirits* into two different Veſſels, each of which contained forty *Drops* of *Corroſive Sublimate* diſſolved, whereby was produced the ſame white Colour in both, and the ſame Precipitation of a reddiſh white *Powder*.

From what has been ſaid there appears, and has been plainly demonſtrated, a perfect Similitude between the two *reddiſh Spirits* above-mentioned, *viz.* the Artificial and the Natural; wherefore the ſame Quantity of the

Volatile Salts of the *Blood* as is contained in a *Drachm* of the *Artificial Spirit*, (and it contains, as I ſaid before, ſeven and twenty *Grains*) is preciſely contained in a *Drachm* of the *Natural*.

Wanting next to find out the exact Quantity of *Salt*, which the *fætid Oil* of the *Blood* diſtilled from a Glaſs Alembick carries over with it, I ſet about the particular *Analyſis* of that *Oil*. I mixed then, as well as poſſible, an *Ounce* of this *Oil* with three *Ounces* of the drieſt *Bole*, reduced to a very fine Powder. This Maſs I divided into ſeveral little Balls, and put it into a ſmall Retort, covered with Clay; and having fitted a proper Receiver to its Neck, after luting it, I placed it in a Reverberatory Furnace. With a very gentle Heat, I firſt drew off two *Scruples* of a limpid *Phlegm* from the *Bole*, and then changing the Receiver, as ſoon as I obſerved the firſt Drop of the *reddiſh Spirit* come off, and fitting another in its Place I drew off with a ſtronger Heat than before Half an *Ounce* and forty-two *Grains* of a *reddiſh Spirit*, every Way reſembling the other above-mentioned. After this, I drew off with the ſtrongeſt Heat two *Drachms*, and one and fifty *Grains* of an *Oil*, every way reſembling the *Bile* in the *Gall-Bladder*, both in Colour and Conſiſtence. But before I proceed further, I muſt obſerve here by the Bye, that there is this Difference between this *reddiſh Spirit* and the *Oil* I am now ſpeaking of, *viz.* that the *Spirit*, being compoſed wholly of *Phlegm* and *Salt*, extinguiſhes the Fire, as appears upon pouring ſome *Drops* of it upon a live Coal; but the *Oil*, as conſiſting only of *Sulphureous* and *Saline* Particles, takes Fire almoſt as quick as *Gun-Powder* itſelf, and is all conſumed in a very bright Flame.

Afterwards, from the *Lixive* which I made of the *Reſiduum* in the Bottom of the Veſſel, I extracted eight *Grains* of a blackiſh *fixed Salt*, which eaſily attracted the Humidity of the Air, was extremely ſharp and pungent to the Taſte, fermented when mixed with *acid Spirits*, and tinged the Tincture of the Flowers of *Mallows* of a green Colour. From what has been now ſaid, may eaſily and very evidently be gathered, that that *Ounce* of the *fætid Oil* of the *Blood*, the *Analyſis* of which I very carefully went through, contained no more than nineteen *Grains* of *Earth*, which remained mixed with the *Bole*.

As therefore there was no Difference to be obſerved, neither in Colour, Smell, Taſte, Conſiſtence, nor Effects, between the *reddiſh Spirit* drawn off from the *fætid Oil* of the *Blood*, and the *reddiſh Spirit*, both the *Artificial* and the *Natural*, above-mentioned, I therefore believe, that each *Drachm* of the *reddiſh Spirit* I am now ſpeaking of, as alſo each *Drachm* of the *Natural reddiſh Spirit* diſtilled from the *Blood*, contains ſeven and twenty *Grains* of this *Salt*.

As to the Quantity of *Salt* which is inſeparably mixed with the glutinous Particles of that *Oil*, which is obtained from the *fætid Oil* of the *Blood*, this, in my Opinion, may eaſily be diſcovered; for as that *Oil* both in its *fætid* Smell and Acrimony exactly reſembles the *reddiſh Spirit* which is obtained from the ſame *fætid Oil* of the *Blood*, and beſides tinges the Tincture of the Flowers of *Mallows* green, in the ſame Manner as the other, it neceſſarily follows, that each *Drachm* of it muſt contain, and have intimately connected with it, ſeven and twenty *Grains* of *Volatile Salt*; the ſame as is contained in that *reddiſh Spirit*, which is procured from the *fœtid Oil* of the *Blood* by Diſtillation.

Having found out then, in the Manner above explained, the exact Quantity of *Volatile Salts*, which both the *Phlegm*, the *reddiſh Spirit*, and the *fœtid Oil* carry along with them in Diſtillation, no Body, I think, can doubt of the juſt Proportion of the Quantities of the different conſtituent Parts of the human *Blood*. For they may be ſeparated from one another without any Loſs of Subſtance, and I have ſeparated them myſelf with very good Succeſs; you can likewiſe weigh them after they are ſeparated, and judge of the exact Quantity of each from the Weight. But I think I hear ſome Body making this Objection; that the *Salt* extracted from the *Blood*, eſpecially the *Volatile Sort*, is *fœtid*, and therefore it retains in it a great many *Sulphureous* Particles, which cannot be weighed, and for that Reaſon their real Quantity cannot be diſcovered. I confeſs this Objection is very juſt, but the Quantity of *Sulphur* found in the human *Blood* is ſo very inſignificant, that it is not worth mentioning.

And here it is not improper to give a ſhort Account of the *Analyſis* of the *Bile*, which I ſet about and perfected about three Years ago. For on the fifteenth of *February* 1696, I forced from it a *Phlegm* as limpid and pellucid as any Liquid can be, and after that a milky Liquor as white as *Milk* itſelf, then ſome other Bodies beſides, which I ſhall not here mention. This *Phlegm* and milky Water I expoſed to the Eyes of all who were with me, and I have it ſtill by me; it is not at all ſpoil'd, but has loſt a little of its Whiteneſs. I conſidered a long while with myſelf what this Water could be, and at laſt I was perſuaded that, from the *Bile* which is diffuſed through the ſmall *Inteſtines*, the *Chyle* extracts a *Sulphur* impregnated with an *acrid Salt*, like the *Volatile* almoſt deprived of its *ſaline-acid* Particles, and therefore very gentle. Nor do I ſcruple to aſſert, that by that *Sulphur* impregnated with the gentle *acrid-acid Salt*, the *Chyle* is rendered white, diſpoſed to ferment within the Cavities of the *Heart*, and prepared to be converted more eaſily into *Blood*.

Hence it follows, that the *Bile* conveyed from the *Liver* to the *Inteſtinum Duodenum*, by the *Ductus Cholidochus*, ſupplies the Maſs of *Blood* with a freſh *Ferment*, to repair and invigorate the *natural Ferment* of the *Blood*, (provided the *Bile* ſtill retains its natural Diſpoſition); and therefore conduces very much to the Duration of this *Ferment*. This Opinion, if it not abſolutely juſt, appears at leaſt very probable, from the following xperiment. I mixed eight *Ounces* of Spring *Water*, having in it a few *rops* of the *Spirit* of *Vitriol*, with a *Drachm* of warm *Bile* taken freſh om the *Gall-Bladder* of a *Wether* that was juſt killed, in the Neck of a laſs Funnel; and immediately the Water put on a milky Whiteneſs, d would have become ſtill whiter, if I had mixed four *Grains* of e *Salt* of *Wormwood* with it.

After I had finiſhed theſe Experiments, I took Notice of ſomething I ad obſerved before, *viz.* that a certain *Phlegm*, extracted from Bread, which in diſtilling brings over with it a *Volatile acid Salt*, if it is mixed with *Bile*, in a ſufficient Quantity, produces a Liquor of the Colour and Conſiſtence of *Milk:* That *Phlegm* turns the Tincture of the *Turnſole*, and of the Flowers of *Mallows* red; and which is more, the red *Spirit* of *Bread* ferments longer both with the *fixed* and *volatile Salt* of the *Blood*, than any other *acid Liquor*; whence it muſt be unavoidably allowed, that a great Quantity of an *acid Salt* can be procured from the *Bread* which we moſtly eat, which, together with an *acid-nitrous Air*, conduces very much to the raiſing and ſupporting the *Fermentation* of the above Liquor.

The Opinion of the College of Phyſicians *at* Rome, *concerning Dr.* Vieuſions's Analyſis *of Human* Blood; *by* Ja. Maria Lanius. *n.* 264. *p.* 599.

2. In order that there may no Intricacies occur to us, in candidly examining the Account you have ſent us of the *Chemical Analyſis* of the *Blood*, together with the Inferences you have drawn from it, we deſire you will give us Leave to reduce that full and methodical Account of your Experiments, chiefly to two *Problems*, which ſhall be the Subject of this Anſwer. We muſt enquire then, in the firſt Place, whether beſides the *acrid*, *alkaline*, *Volatile*, and *Fixed Salt*, there is any *acid Salt* likewiſe; and whether that *acid Spirit* which you drew off by *Art* from the *Blood*, exiſted in it before, while it circulated in the Body? And in the next Place, whether the *Proportion* which the *conſtituent Parts* of the *Blood* bear naturally to one another, as to Weight and Quantity, can by any Art be reduced to certain Rules?

As to the firſt *Problem*, we confeſs with you, that it is a very palpable Miſtake, that an *acid Salt* cannot be ſeparated from the *Blood:* For whoever ſuppoſes this, muſt ſuppoſe that there is no *Acid* in the Maſs of *Blood*. But that there is, even *Hippocrates* himſelf has obſerved; and which is more than the Authority of any Author, a great many Reaſons, and very obvious Experiments, very plainly evince the Truth of it. For we take in with our Meat and Drink, both *Sea Salt*, and ſeveral different Kinds of *acid Salts*, which, although in a natural State, they are in a great Meaſure dulcified and volatilized by the *Alkaline* ones, yet in Diſeaſes it frequently happens, that being reſtored to their native *fixed* State, they are ſecerned from the *Blood*, and thrown out of the Body, in the Form of *Sweat*, *Spittle*, *Urine*, and other *Excretions*, which are evidently *acid* to the Taſte. Nor does there ſeem any Room to doubt, that the *Sea Salt*, which is placed amongſt the *Acids* in People in Health, likewiſe exiſts in the *Blood*. For if you put a little *Blood*, as it comes out of a *Vein*, upon a Plate of *Salt*, and allow it to dry ſpontaneouſly, it affords a very curious Spectacle with a Microſcope, exhibiting two different Species of *Salts*, one of which has its Cryſtals of the Figure of *common Salt*, and the other of the Figure of a *Volatile Salt*. Beſides, the *Blood* dried in a Furnace, and then expoſed to the Fire, catches the Flame with a Crackling like that of *Sea-Salt*, as the famous *Boyle* has obſerved in his *Hiſtory of the human Blood*, who, in *Tit.* 22. ſpeaking more expreſsly of that Hiſtory, he ſays, That by a ſtrong Calcination he had extracted three or four *Drachms* of the *Fixed Salt* of the *Blood*, which he found to be like *Sea Salt*, according as he expected. Thus then the Exiſtence of an *acid Salt* in the *Blood*, being perceivable

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perceivable even to the naked Eye, it may juſtly be concluded, that the *acid Salt*, by the Aſſiſtance of *Chemiſtry*, may doubtleſs be extracted from the *Blood*. Beſides, as there is no Body, even the greateſt Novice in *Chemiſtry*, who will exclude a *fœtid Oil* from the *Blood*, ſo likewiſe no Body can deny the Exiſtence of an *Acid* in the *Blood*, as a *ſulphureous Acid* enters into the natural Compoſition of *Oil*.

The only Doubt which remains with us upon the Subject, ſeems to be this; whether that Liquor, which is compoſed of an *acid Salt* ſeparated by a particular *Analyſis* from the *fixed Salt* of the *Blood*, and an irritating *Spirit*, ſtronger, you ſay, than the *Spirit* of *Vinegar* itſelf; whether, I ſay, that Liquor is produced wholly and ſolely from the *Blood*? Or whether it does not rather owe a Part of its *Acidity* to other intervening Bodies joined with it in the Proceſs? For although ſome of the *Chemiſts*, out of an implicit Faith in their Preceptors, conſtantly affirm, that in *Chemical Diſtillations* none of the Particles of Fire are entangled with the Bodies diſtilled; yet, the ingenious and well experienced *Boyle*, treating of the *Chemical Analyſis* of the *Blood*, owns very freely, that he was not ſure, but in repeated Diſtillations ſome Particles of Fire might be aſſociated with the Particles of the diſtilled Liquor. And as every Body knows, that Fire is a *ſulphureous Acid*, you cannot help ſuſpecting, that the *acid Spirit* which is drawn off from the *Blood* by the violent Heat of a Reverberatory Furnace, muſt at leaſt have ſome Mixture of igneous Particles combined with it. Neither can this Objection be mitigated by what you hint, *viz.* calcining the *Blood* in the *Rays* of the *Sun*, &c. For you know very well, that they are both Fire themſelves, and excite it in other Bodies. But that *Aſhes* expoſed to the Air after Calcination, ſhould imbibe much *Salt* from the *Acid* of the ſurrounding *Atmoſphere*, is to me, I confeſs, not eaſy to be conceived.

Sceptical Chemiſt, Hiſt. S. K. *Part* 4.

But let us paſs over this, laying it down for certain what we are ſtill in doubt about, concerning the Admixture of fiery Particles with diſtilled Bodies, and the Attraction of the *acid Spirit* from the Air. Let us come to that about which all the *Chemiſts* unanimouſly agree, and which you likewiſe own in a Treatiſe you have publiſhed, *viz.* that all the *Bolar Earths* have an *acid Spirit*, which can be drawn off by the Retort upon diſtilling them alone, without the Admixture of any other Body; who then that conſiders attentively the Method by which you ſeparate from the *fixed Salt* of the *Blood*, a *Spirit*, more *acid* than the *Spirit* of *Vinegar*, will not preſently ſuſpect that this ſtrong *acid Spirit* is not produced from the *fixed Salt* of the *Blood* only, but from the double Portion of *Bole* mixed with it in Diſtillation? And for this further Reaſon, that the *Chemiſts* find they can draw off from *Sea Salt*, for Example, a greater Quantity of *acid Spirit*, the greater that the Proportion of *Bole* is, they mix with it. It is therefore very true, that the Mixture of *Bole* conduces very much both to the Production and Increaſe of the Quantity of the *acid Spirit*; and it is impoſſible for any Body to affirm, that the *acid Spirit* produced by the Help of *Chemiſtry* from the *Bole* and *fixed Salt* of the *Blood* mixed together, is wholly derived from the one or the other.

But here you will ſay to us, if you are firmly perſuaded that there is naturally a greater Quantity of *Sea-Salt* than of the reſt in the *Blood*, at leaſt ſhew me the Method whereby its *acid Spirit* may be drawn off, without the Addition of any other Subſtance. That I may not ſeem to make a Secret of any Experiments, I muſt freely own to you, that upon conſidering that the *Bole* is made uſe of in diſtilling of *acrid Salts*, on Purpoſe to hinder their being fuſed by the Fire, and conſequently prevent the Aſcent of the Spirits, I immediately thought, whether the *Earth* of the *Blood*, after every Thing elſe except the *Sea-Salt* is drawn from it, might not, by ſeparating the Particles of the *Salts*, very well ſupply the Place of *Bole*, in extracting the *acid Spirit* of the *Blood*. In order to find out this, a very induſtrious Artiſt here, *Franciſcus Pirotti*, took the *Fæces* of the *Blood*, which were left in the Bottom of the Retort after all the *Volatile Parts* were drawn off, and which were impregnated, eſpecially with the *Sea-Salt*, and put them by themſelves into a low Glaſs Retort. And the Proceſs being carried on according to Art, I was not at all deceived in my Expectation; for by the Heat of the Reverberatory, there was raiſed up a *Fume*, which was collected in the Bottom of the Receiver, into Drops of a Liquor moderately *acid*, which did not effervefce in the leaſt with other *Acids*, but evidently with *Alkalies*. And in this Operation it is not to be doubted, that the *Acid* procured from the above *Caput Mortuum*, belongs really to the *Blood*, ſeeing there was no foreign Body, except Fire, joined to it.

Wherefore, as I hinted above, I will not diſpute with you, that the ſtrong *acid Spirit*, which you obtained from the *Blood*, was not in ſome Meaſure produced from the true *Salt* of the *Blood*. For I am of your Opinion, that the *fixed Salt* of the *Human Blood* is not of a ſimple Nature, but compound, *viz.* an *Acid* and *Alkali* joined together. And ſince ſuch is the Texture of a *fixed Alkaline Salt*, that cloſely cohering by the Heat of the Reverberatory, it will rather vitrify than allow one Particle to aſcend, as *Hoffman* has likewiſe obſerved, hence may eaſily be removed a Difficulty, which might occur to People leſs verſed in *Chemiſtry*, concerning the Diſtillation of the *fixed Salt* of the *Blood*, viz. whence happens it, that from the *Aſhes* of the *Blood*, which are apparently *Alkaline*, you can only diſtil an *acid Spirit*: Becauſe the Particles of the *Alkaline Salt* are more fixed, and almoſt vitrified in the Retort, while thoſe of the *acid Salt* are put into Motion and carried upwards.

I come now to conſider the other *Problem*, which though you have been at a great deal of Pains, made a great many Experiments, and have ſhewed a great deal of Ingenuity in attempting to reſolve, yet I very much doubt whether you have got the better of every Difficulty about it, or will ever be able to do it. For although the *Proportion* between the Conſtituent Parts and the whole Maſs of the *Blood*, could be diſcovered in any individual Perſon, yet to be able to find out one univerſal and certain Rule of that *Proportion*, which ſhould agree with the *Blood* in all Perſons, ſeems to me to have more the Appearance of Truth, than of the Truth itſelf in it. And indeed, in my Opinion, there are a great many Arguments which make it quite impoſſible for us to find out this *Proportion.* In the firſt Place, it is an indiſputed *Axiom* amongſt all *Mechanicks* and *Arithmeticians*, that the true *Proportion* of the Weight of Parts to the Whole, or of Aggregants to the Aggregate, cannot be known, without knowing likewiſe the Weight of the Whole, and of the Parts, or the Weight of the Aggregate and of the Aggregants. But here, to lay aſide all Prepoſſeſſion in the Affair, there is no Body endowed with Senſe and Reaſon, but muſt acknowledge the Difficulty and Impoſſibility of demonſtrating theſe Weights. For as to the Whole, for Example, that is, the whole Maſs of *Blood*, who is there that does not ſee, that there is not the ſame certain and determined Quantity in all, when it is extremely hard to find it out in any one Body? And hence it is that ſome Writers have admitted eight Pounds of *Blood* in a *Man*, ſome twenty, ſome two and twenty, ſome more, and ſome leſs. Neither is it poſſible to overcome this Difficulty of finding out the true Weight of the *Blood*, as not only the Diameters of the containing Canals differ from one another in every Individual; but, which is more, the whole Maſs of *Blood* cannot be taken from a Man, even if his Throat was to be cut, and therefore the whole cannot be weighed. For there are ſo many Turnings and Windings of the Canals, ſo many Receſſes in the *Viſcera*, and eſpecially the Veſſels of the *Vena Portarum*, which are diſtant from the *Cava*, are ſo large, that there is a great deal of *Blood* left in the *Abdominal Viſcera*, even in Animals that are killed, and afterwards hung up by the Heels upon the Shambles.

Nor is that Subterfuge of any Force to weaken the Strength of my Argument, *viz.* that in order to find the *Proportion* between the Whole and its Parts, it is ſufficient to know the particular Weight of one Part like the Whole, and then to find out the particular Weights of the different Principles which compoſe this Part: Becauſe, in this Caſe, we could juſt as well find out the Rule of *Proportion* between the *Blood* and its *Principles*, if we knew exactly the true Weight of any *Portion*; as the *Blood*, and the particular Weights of the *Principles* compoſing that *Portion*; for (whatever may be the Validity of this *Hypotheſis* in *Fluids*, which have a certain Specifick Gravity) there is a very great Difficulty in determining the true Weight of one *Portion* of the *Blood* like the Whole, and in diſcovering the ſame *Proportion* in each of the different *Principles* of which this *Portion* is compoſed. And in the firſt Place, becauſe the *Specifick Gravity* of the *human Blood* is more hard to determine, than any one could well imagine, as the great *Boyle* has demonſtrated after *Sanctorius*; for it varies in the ſame Perſon according to the different Seaſon of the Year, and even the Time of the Day, and according to its being taken away ſooner or later after eating. And does not likewiſe the *Arterial Blood* differ conſiderably in its *Specifick Gravity* from the *Venal*, and the *Blood* in the *Vena Cava* from that in the *Vena Portarum?* We therefore can never be certain neither of the Weight of the whole *Blood* in all, or in any particular Perſon, nor of the true *Specifick Gravity* of any Portion of the *Blood*, with reſpect to the whole Maſs.

In the laſt Place, the Weight of the particular Parts which compoſe either the whole *Maſs* of *Blood*, or any certain Portion of it, can far leſs be determined, becauſe by the Addition of new Bodies, *viz.* the Fire, *Bole*, or ſomething *acrid*, or by the exhaling of ſome of the native Particles, it muſt neceſſarily happen, that ſome of theſe Parts ſhould fly off inſenſibly into Air, whereby their former and natural Weight, and conſequently their true *Proportion* with one another, muſt very much vary. And for this Reaſon we find, that the induſtrious *Boyle* above cited, when he endeavoured to make an accurate Diſtillation of the *Blood*, yet upon weighing ſeparately the different Bodies he had extracted from it, he found an evident Defect of a good many *Drachms*. And therefore he very juſtly calls it a Paradox, which *Chemiſts* impoſe upon us, *viz.* that in accurate Diſtillations, the Bodies drawn off or ſeparated, make up exactly the Weight of the Whole. Neither do I aſſert this entirely upon the Credit of *Boyle* and other Authors of Veracity; for I myſelf have found, after as careful a Chemical *Analyſis* of the *human Blood*, as I was able to make, that the Weight of the Parts, when they were ſeparated, was by no Means equal to that of the Whole. For out of ſeven *Ounces* and ſeven *Drachms* of *Blood*, there wanted more than Half an *Ounce* after Diſtillation; and I make no manner of Queſtion, but the very ſame Thing happened in the Experiments which you made.

As then we cannot diſcover the true Weight. neither of the whole *Blood*, nor of the different Parts of it, we can therefore have no Hopes of finding out the true *Proportion* that is between theſe different Parts.

But beſides the Impoſſibility of finding out by Art the certain Weight of the Whole, and of the different Parts of the *Blood*, there is ſtill another which ariſes from the Nature of the *Blood* itſelf: Which as it is different in every particular Perſon, it is in vain to expect to find out a *Proportion* between the *Blood* and its Parts which ſhall agree in every Body. For, as *Hippocrates* ſays, Nature differs from Nature, *viz.* according to the different Diet, Age, Countries, Seaſons, Sex, Paſſions of the Mind, Exerciſes of the Body, and eſpecially the Structure of the *Viſcera*, and the Force of Ferments, there ariſe different Conſtitutions in Men, which plainly indicate different *Proportions* of the Component Parts of the *Blood* in different Subjects. And hence it is that the Manners as well as the Diſeaſes of Men, not only widely differ from one another, but are even changed. Nor needs there much Argument to prove the eaſy Variation of the Component Parts of the *Blood* in one Perſon from another, when, according to your Aſſertion, a ſingle *Grain* and a Quarter of the *Volatile Salt* of *Human Blood* is ſufficient to diſturb a whole Pound of diſtilled Water, and ſo produce a new *Proportion* in it, as 1 to 11525. Theſe Differences of the *Blood* in different Conſtitutions, which no Body can deny, are ſufficiently confirmed from *Wine* and *Milk*, which being Heterogeneous Fluids, and very analogous to *Blood*, are altered in ſuch a Manner in their Component Parts, from the Climate, Soil, Seaſon of the Year, and Age, that they can admit of no true Rule of *Proportion*, agreeing with each of them.

To conclude, I would earneſtly deſire you, leaving general *Hypotheſes*, to conſider carefully the *Proportion* you have mentioned, of *one Drachm* of *Fixed Salt to fifty Pounds of Blood* from which the *Salt* was extracted, (for I paſs by here, conſidering ſo many *Pounds of Blood* taken from the Veins not of one Perſon, but of ſeveral, and perhaps likewiſe ſick, which muſt alter very much the natural *Proportion)* and compare this *Proportion* with that of five *Scruples* of the ſame *Salt* which *Boyle* got from one *Pound* only of *Blood*; and you will find, which is ſurpriſing, theſe *Proportions* differing ſo much from one another, as that the Quantity extracted by *Boyle* is almoſt ten Times the Quantity of what you got in *Proportion* to the Quantity of *Blood*. And at *Rome* we find the *Proportion* differing very much both from *Boyle*'s and yours. But whether the Cauſe of theſe Differences is to be attributed to the different Diſpoſitions of the different *Portions* of *Blood*, or the different Ways of managing the Proceſs at *London*, *Montpelier* and *Rome*, I leave to others to determine; which ever the Caſe is, my Argument will ſtill ſtand good: For whether the Difference is owing to the different Temperaments of the *Blood* in different Perſons, or to the different Methods of the Artiſts in making the Experiments, there ſtill remains an inſuperable Variety to render that *Proportion*, which we want to diſcover, doubtful.

A ſtrange Kind of Bleeding *in a little* Child; *by* M. Sam. du Gard. *n.* 109. *p.* 193.

XVI. A *Child* (about a quarter of a Year old) at *Littleſhall* in *Shropſhire*, about *Candlemas* 167¾ was taken with a *Bleeding* at the Noſe and Ears, and behind the hinder-part of the Head, where there was nothing at all of any Sore: This laſted for 3 Days; at the End of which, the Noſe and Ears ceaſed *Bleeding*: But ſtill *Blood* came, as it were Sweat, from the Head. Three Days before the Death of the *Child* (which was the *ſixth* Day ſince ſhe began to *bleed*) the *Blood* came more violently from her Head, and ſtreamed out to ſome Diſtance from it: Nor did ſhe *bleed* only there, but upon her Shoulders and at the Waſte, in ſuch Quantities, that the Linnen next her might be wrung, it was ſo wet; and every Day required clean Linnen. She for 3 Days *bled* alſo at the Toes, at the Bend of her Arms, at the Joints of her Fingers of each Hand, and at the Fingers Ends; and in ſuch meaſure, that in a quarter of an Hour the Mother hath catched from the Droppings of the Fingers, almoſt ſo much as the Hollow of her Hand would hold. All the Time of this *Bleeding* the *Child* never *cried* vehemently, but only groaned; though about 3 Weeks before, it had ſuch a violent Fit of *Crying* as, the Mother ſaid, ſhe never heard. After the *Child* was dead, there appeared in thoſe Places where the *Blood* came, little Holes like the Prickings of a Needle.

This Account I had from the Mother of the *Child*, who is a very ſober Woman; and ſhe told it me with Tears. She alſo told me, that the *Blood* was not thin, like Water, but of that Thickneſs as *Blood* uſually is; and that ſhe and others believed there was little or no *Blood* left in the Body of the *Child*.

A Periodical Evacuation *of* Blood *at the End of the Fore-finger; by Mr.* Aſh. *n.* 171. *p.* 989.

XVII. *Walter Walſh*, an Inn-keeper in *Trym*, born in *Ireland*, of a temperate Diet, ſanguine Complexion, and pleaſant Humour, in the 43d Year of his Age, *Anno* 1658, about *Eaſter*, was ſeized with a great Pain over all his Right Arm; a great Heat, and Redneſs in his Right-hand, and a Pricking in the Point of the *Fore-finger*, whereon there appeared a ſmall *Speck*, as if a little Thorn had run in: And ſuppoſing it ſuch, he opened it, whereupon the *Blood* ſpun out in a violent, but ſmall Stream. After it had ſpent its Violence, it would ceaſe for a while, and only drop, and then ſpring out with Violence again, continuing thus for 24 Hours, till at laſt he fainted away, and then the *Blood* ſtanched of itſelf, and his Pains left him. From that Time, during his whole Life (which continued 12 Years) he was frequently troubled with like Fits, ſeldom having a Reſpite of 2 Months; and they never returned oftner than in 3 Weeks. He rarely *bled* leſs than a Pottle at a time; the oftner the Fit came, the leſs he *bled*; and the more rarely it aſſaulted him, he *bled* the more: Whenever they endeavoured to *ſtanch* the *Blood*, it raiſed moſt exquiſite Tortures in his Arm; no Remedies that were ever uſed, proved in the leaſt effectual; he had no other Diſtemper that troubled him; neither Seaſon nor Weather wrought upon him; he had no outward Accident that at firſt brought the *Bleeding*; Drinking more than ordinary made him more apt to *bleed*; he had no Child after his firſt Seizure. Theſe frequent Fits brought him at laſt very low, inſomuch that towards his latter End he *bled* but little, and that too but like diluted Water. He died of this Diſtemper on *Feb.* 13, 16$\frac{69}{70}$.

An Eruption *of* Blood *at the* Glandula Lachrymalis; *by Dr.* Clopt. Havers. *n*, 208. *p.* 51.

XVIII. An icterical diſcontented Woman, having a Deſire to die, wholly rejected the help of Medicine, and within 3 Months being well nigh her End, there happened an *Eruption* of *Blood* out of the *Glandula Lachrymalis* of one of her Eyes, without any external Injury. There was an Evacuation of ℔ij. of *Blood*, within the Space of 30 Hours. About a Week after the ſame Sluice was opened again, and ſhe *bled* till ſhe died.

An admirable Eſſence for ſtanching Blood; *by M.* Denys. *n.* 94. *p.* 6039.

XIX. Here [in *France*] hath been found out an admirable *Eſſence*, which being applied to any *Artery* whatſoever, ſtops the *Blood* inſtantly, without any need of binding up the Wound. We firſt experimented it upon *Dogs*, of whom I have cut the *Crural* and *Carotid Arteries*, and the Thigh itſelf; and the *Blood* ſtopped in a little while, the Wound healing without any *Scar*, *Suppuration* or *Cicatrice*. We have alſo made Trials upon *Men*, of whom the *Temporal Arteries* were opened; and upon others, whoſe Hands and Face had been cut, and it ſucceeded with them as well as it did upon *Dogs*.

This *Liquor* works not only outwardly, but alſo being taken inwardly; for it ſtops the Loſs of *Blood* in *Fœminis*, inveterate *Fluxes* of *Blood*, upon *Hemorrhoides*, and other Hemorrhagies.

Experiments *made with this* Liquor; *by Dr.* Walt. Needham. *n.* 95. *p.* 6052.

XX. 1. *May* 30, 1673, A *Dog* had the Skin of his Neck ſlit open, and flay'd by Mr. *Serjeant Wiſeman*, ſo that the *Jugular Vein* lay bare. He then with his Lancet opened it, and immediately applied to it a Button-pledget of Lint dipt in the *Styptick* ſent from *France.* This being done, he took up the *Muſcles* on the other Side of the Throat, and divided them till he came to the *Carotid Artery.* This he likewiſe opened with his Lancet, and applied a Pledget after the Manner aforeſaid. Theſe Pledgets being kept on by Preſſure of the Thumb about a quarter of an Hour, were then taken off. The Veſſels *bled*, but not freely: Whereupon the Pledgets were changed for freſh ones, and kept on a quarter of an Hour more; being then firſt let looſe, and afterwards taken off, the *Vein* and *Artery* were knit and ſoldered together.

2. The ſame Day a Patient, whom *Serjeant Wiſeman* had newly dreſſed with a *Cauſtick Stone* in the Neck (upon ſome *ſcrophulous* Swellings) was brought back to us in a Coach, having *bled* all the Way, to the wetting almoſt of a whole Sheet. The Veſſel lay ſo deep, that it was hard to reach it. However, Mr. *Wiſeman* dipped two Pledgets in the Liquor aforeſaid, and thruſt them into two Orifices whence the *Blood* came. It was immediately ſtopped, and the Neck dreſſed up without any conſiderable Bandage.

3. 1. The ſame Day a young Woman's Breaſt being cut off by the ſame Chirurgion, the *Arteries* were ſtopped, by holding the like Pledgets in the Mouths of them, whilſt the Dreſſings were fitted for the Breaſt. The Pledgets being then thrown off, the *Blood* continued ſtancht, and the Mouth of the *Arteries* remained cloſe.

2. The Woman, whoſe Breaſt I cut off, *May* 30, 1673, laboured under a *Cancer* ulcerated. She was weak and much indiſpoſed, by reaſon of the frequent *Bleeding* from a Veſſel out of our Reach. About 2 Hours after the Account given above by Dr. *Walter Needham*, ſhe was taken with a *Vomiting*, and her Breaſt *bled.* I was ſent for, and found her ſwooning. I took off the Dreſſings, and perceived one of the *Arteries* to *bleed* a little. I applied the *French Eſſence*, and ſtopped it, but doubting the ill Conſequence, if it ſhould *bleed* again in the Night, I ſecured that *Artery* by the Touch of a hot Iron. *By Mr.* Rich. Wiſeman. *ib.*

4. *June* 11, 1673, A Dog's *Crural Artery* was cut quite acroſs with an Inciſion-knife, before the *Royal Society*, by Dr. *Needham.* The Blood guſhing out copiouſly, a Lint, dipped in the ſame *Liquor*, was applied to the Wound, and held upon it a little while; when, by reaſon of the great Glut of *Blood*, that could not be well wiped away for want of a Spunge (which made the Experimenter conjecture the Application had not been exactly made) the Lint was changed for a freſh one dipped in the *Liquor*, and kept on about half an Hour, and being then let looſe, the *Blood* was ſoon *ſtanched*; whereupon the *Dog*, being unbound, licked the Wound, and walked away without any Ligature.

5. *Jun.* 18, 1673, Mr. *Denys* himſelf being come to *London*, made another Trial before the *Royal Society.* In the *Crural Artery* of a *Dog* was made an oblique wide Cut, and the *Liquor* in the uſual Manner being applied to *By M.* Denys. *Ib.*

it, the *Blood* was *ſtanched* in 7 *Minutes*, and the *Dog* being then let looſe, but yet kept quiet for 23 *Minutes* longer, he then aroſe and let fall the applied Compreſs, and went away without any Bandage.

By—— *Ib.* 6. *Jan.* 20, 1673, Two *Calves*, of the bigger Sort, were brought into the *Banquetting-houſe* by the *King*'s Command. The *Crural Artery* of one of them being laid bare, it was cut open long-ways with a Lancet, and preſently a Lint dipped in the ſaid *Eſſence* applied to the *Wound*. The *Blood* was *ſtopped* in about a quarter of an Hour: But the Animal being big and ſtrong, and ſtriving continually to get up, the *Artery* broke out again; whereupon a freſh Lint, dipped in this *Healing-water*, was laid on again. The *Blood* was at length ſo ſtopped, that about the End of 2 *Hours* the Beaſt aroſe, walked about the Houſe, without loſing any *Blood* more, though the *Wound* had no Bandage on it. Of the other *Calf*, the Butcher quite cut off one of his Legs, as high as he could, and the *Blood* ruſhing out impetuouſly, a Compreſs of Lint, dipped in the *Eſſence*, was preſently applied to the Part. Here more Care was taken than before, of keeping the Animal quiet; and about the End of a *quarter* of an *Hour* the *Blood* was found perfectly *ſtanched*. Several of the *King*'s Phyſicians and Chirurgions did examine the Wounds, after the *Blood* was ſtopped, and found them clear, without any *Eſcarr*; and his *Majeſty*, who was preſent at theſe Experiments, declared himſelf publickly to be very well ſatisfied with it.

By—— *n*.99.*p*. 6079. 7. The *King* having given Order that Mr. *Denys* ſhould be deſired to communicate the Secret, a Quantity of it was made in his *Majeſty*'s own *Laboratory*, of which Trials were made upon 3 Calves at *Whitehall*, *July* 12, 1673, a Leg of each of them being cut off, as high as was poſſible, and the *Blood* of them ſtopped with this new *Liquor*, to the Admiration of all the Spectators: For this *Water* having been prepared with more Exactneſs than ever, the *Effect* of it was ſo quick and powerful, that the *Blood* was ſtopped in 4 *Minutes* of Time; the *Calves* by their Motion making the Pledgets to fall off, that had been put on the Parts cut, and not a Drop of *Blood* appearing.

By—— *n*.95 *p*. 6074. *n*.96.*p*.6078. 8. 1. *July* 1673, The Leg of a poor Woman (labouring under an inveterate *Scurvy* and the *King's-Evil*, in the *Hoſpital* of St. *Thomas*) was cut off, becauſe of a *malignant Ulcer*, not ſuffering her to ſleep Day or Night. Immediately afterwards, the *Arteries* were dreſſed with ſome Linnen Pledgets dipped in the *aſtringent Liquor*, with a Compreſs upon it, and a Bandage keeping all cloſe againſt the *Arteries*. The Succeſs was, that the *Blood* was *ſtanched* without any other Dreſſing: And inſtead of complaining, as thoſe are wont to do who have a Limb cut off, and the Mouths of whoſe *Arteries* are burnt with an hot Iron, or a *Cauſtick*, to ſtop the *Blood*, this Patient looked very chearful, and was free from Pain, and *ſlept* two Hours after, and alſo the Night following, and from that time found herſelf ſtill better and better, without any Return of *Bleeding*, or any ill Accident.

2. *July* 5, 1673. In the ſame *Hoſpital*, the Leg of a Seamen was cut off, becauſe of a *Wound*, accompanied with a *Fracture*, made by a Cannon Bullet. After the Part was dreſſed, as above, with Linnen dipped in the *Eſſence*, the *Blood* was *ſtopped* in leſs than half a quarter of an Hour. There

was made a Bandage, that preſſed the Linnen againſt the cut *Arteries* ; and without any other Thing, the Patient found himſelf ſo eaſed of the Pains he felt before, that he *ſlept* two or three *Hours* after, and all the Night following.

Next Morning, the *Dreſſings* of the Woman, as well as the Man, were taken off in the Preſence of the Phyſicians and Chirurgions, who were ſent by the *King* to ſee the Operations ; and they all did acknowledge, that no *Wounds* could look more fair and ruddy ; there appearing no *Eſcarr* at all, nor any more *Blood* than if there had never been any *Veins* or *Arteries* opened in that Part.

9. The *Royal Stiptick* Liquor was uſed in the Engagement againſt the *Dutch*, 1673, by the Chirurgions of the Earl of *Oſſory*, Sir *Edward Spragg*, and Sir *John Berry*, and others, with admirable Succeſs. A very good Phyſician in *Yarmouth*, ſeveral credible Perſons alſo in *London* and other Places (ſome of whom have taken it *inwardly* themſelves) do give the like Commendation of it, for *ſtopping Bleeding* upon *Eruption*, or Apertion, of a Veſſel in the *Lungs* or other *internal Parts*.

By ———
n. 97. *p.* 6115.

XXI. 1. A large *Dog* being provided, an Aperture was made through the common *Integuments* of his *Abdomen*, whence the *ſmall Guts* were extruded ; after an Inciſion made in one of them according to its Length, they were again reduced ; the *Wound* in the *Abdomen* being ſtitched up, a Solution of this *Powder* was applied ; the *Dog* continued without any ill Symptoms, and became perfectly well in a few Days after. The like Experiment I have made on another *Dog*, who, in like manner, recovered without the Application of any Medicine.

Experiments made with Mr Colbatch's Styptick ; *by Mr.* Will. Cowper. *n.* 208. *p.* 42.

2. The *Leg* of a *Dog* was amputated 3 Inches above the *Patella* ; the Expence of *Blood* from the *Arteries* was great, which did partly proceed from the Unaptneſs of the Applications which were prepared ; but after two or three Attempts, the *Flux* of *Blood* was *ſtopped*, and ſuch a Bandage made uſe of as was neceſſary only to keep on the Dreſſings : The *Dog* continued without any conſiderable *Flux* of *Blood*, and the next Day he was found on his three *Legs*.

The diſeaſed Arm of a Man in St. *Bartholomew*'s *Hoſpital* was amputated above the Elbow ; but for above a quarter of an *Hour*'s time many ſucceſsleſs Applications of this *Stiptick* were made, and at length a ſmall Tent dipped in the *Powder* itſelf, inſerted into the Extremity of the *bleeding Artery*, before the *Flux* of *Blood* would admit the Application of Bandage. Five *Hours* after, a freſh *Flux* of *Blood* appeared, and ſtrict Bandage was applied. The ſame Morning, the above-mentioned Amputation was made, a Boy about 12 or 14 Years of Age had his Leg alſo taken off below the Knee, to whoſe Stump divers ſucceſsleſs Applications of this *Stiptick* were alſo made, before it was bound up, and in leſs than an *Hour* after, a freſh *Flux* of *Blood* happened, and ſtrict Bandage was added. Some *Hours* after theſe Operations, both theſe Patients ſuffered extravagant Pains : Three Days after the Applications were taken off ; and had any Perſon, a Stranger to what had been done, ſeen the Stumps, he would have ſuppoſed nothing leſs than an *actual Cautery* had been applied, or could have occaſioned ſuch large *Eſcarrs*, and ſo horrid an Appearance; which did ſufficiently denote this *vulnerary Powder* to be a *violent Cauſtick*.

Trials of *Stipticks* on the Bodies of *Quadrupedes* have been commonly practiſed, to commend them to the Publick; but it is not without Cauſe that Pretenders to ſuch Remedies have made choice of younger Animals, as *Dogs* and *Calves*, &c. for that Purpoſe. But ſince the only Standard of their Uſe is their Succeſs on the *humane Bodies*, we ought to make our Experiments on thoſe Animals, whoſe Magnitude and Age bear a Proportion to it. For nothing is more obvious in wounding the *Arteries* of living Animals, than that the Protruſion of their *Blood* bears a Proportion to their Bulk; and in Diſſection, the *Arteries* of the *Fœtus* are remarkably thinner than thoſe of an *Adult*; and thoſe of *aged* Bodies grow ſtill thicker, and frequently become *cartilaginous*, and at length entirely *boney*; of which Dr. *Tyſon* and myſelf have ſeveral Pieces.

Some Animals having Lungs yet wanting the Pulmonary Artery; *by Dr.* Swammerdam. *n.* 94. *p.* 6040.

XXII. In my Diſſections of late, I have met with ſome Animals, which although they have *Lungs*, yet Nature has denied them a *Pulmonary Artery*, ſo that the *Blood* is immediately diſtributed from the *Heart* through the whole Body, without undergoing any previous Circulation or Conquaſſation in the *Lungs*. No Body, I believe, will deny that *Frogs* have *Lungs*, ſince *Malpighius* publiſhed ſo many curious Diſcoveries about them, and *Walter Needham* has evidently proved they reſpire. In theſe amphibious Creatures however the *Pulmonary Artery* is wanting. Wherefore neither does their *Blood* circulate through the *Lungs*, nor is it ſtrained nor elaborated there; being ſent immediately from the *Ventricle* of the *Heart* through the whole Body, without touching the *Lungs*, which ſeems to me to be no bad Argument, amongſt others, for reſtoring the Doctrine of the *Liver*'s being a *Viſcus* of Sanguification.

However, in the external Coat of the *Lungs* of *Frogs*, there is a plain *Artery*, (analogous to the *Bronchial*, or rather *Pulmonary Artery*) which is ſpread over their Surface in a ſurprizing manner, like a wonderful Network, and penetrates gradually the internal Veſicles, with its moſt minute Branches, and there it anaſtomoſes (according to my Opinion) with the *Pulmonary Vein*, as you may even diſcover with the naked Eye. This *Vein* is twice as large as the *Artery*, and is ſituated in the Cavity of the *Lungs*, eſpecially about the Mouths and the Interſtices of the *Veſicles*, from which it ſends out to all the Cells, and to the ſurrounding Coat of the *Lungs*, a great many capillary and almoſt inviſible Branches.

Thoſe Animals which I ſuſpect to have the ſame Structure of the *Lungs* with *Frogs*, are *Toads*, *Lizards*, *Serpents*, the *Chameleon*, *Tortoiſe*, the *Water-Salamander*, and any other Animals, whoſe *Lungs* are *membranous*, if there are any other.

An Aneuriſma *of the* Arteria Aorta; *by Mr.* Lafage. *n.* 267. *p.* 696.

XXIII. In the Year 1685, a Servant to my Lord *Culpeper*, got a Fall which cauſed him a heavy Pain in the Breaſt for a while. About a Month after this Accident, a Muſket burſt in his Hands, and gave ſo violent a Recoil againſt his Right Side, that it made him *ſpit Blood* immediately, and continued for 6 Months. A Year after he began to feel a Pulſation on that Side, and then he *ſpit Blood* again, which continued, but only in the Spring and the Fall, till he died. He *bled* likewiſe by the *Noſe* twice a Year, for a Month every time. In 1695, or 1696, a Tumour began to appear under the Right Nipple, which growing by little and little, came to an extravagant Bigneſs, and at laſt, after uſing ſome emollient Ointments upon it, of its own Accord, it broke ſuddenly, and he ſoon after died. Mr. *Laſage* opened the Body, and found that two of the *Cartilages* of the Ribs were worn off, by the continual *Pulſation* of the Tumour: Part of the *Sternum Bone* was alſo worn off, by the ſame Cauſe. The *Dilation* of the *Artery* began preciſely on its Trunk next to the *Heart*, before it divided itſelf into the *Aſcending* and *Deſcending* Trunks; and though there is but a little Place, yet it did *dilate* itſelf ſo exceſſively, that the Bag did fill up the whole Cavity of the *Thorax* on the Right-Side, and preſſed the *Lungs* ſo much, that they were thereby much diminiſhed; the Bag by the Outſide did adhere to the *Mediaſtinum*, to the *Diaphragma*, the *Pleura*, and to the *Sternum*, in which it had digged two great Holes, ſo ſtrong was the Impulſion. The inſide of that Bag was lined, almoſt all over, with *Bony Laminæ*, ſome larger, ſome leſſer, like ſo many Shells; the *Heart* was mightily relaxed, inſomuch that it was twice as large as it ought to be; and amongſt its Fibres there were ſome *Stones*, like them which are ſometimes found in the *Lungs* of *ſcrophulous* Bodies.

Explanation of the Figures. Fig. 63.

Fig. 63. *A*, The *Heart*, *B*, The *Aorta*, next to the *Heart*, where the *Aneuriſma* began. *C C*, The ſame *dilated*, making the Bag of the *Aneuriſma*. *D*, The *Deſcending Aorta*. *E E*, The two *Axillary Arteries*. *F F*, The two *Carotid Arteries*.

Fig. 64.

Fig. 64. *A*, The *Heart*. *b b b*, The *Valvulæ Semilunares*, in the *Bag*. *C*, The *Aorta Deſcendens*. *D*, The Orifice of the *Aorta* into the *Bag*. *E E*, The two *Axillary Arteries*. *F*, That Part of the *Bag* where it broke. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. The *Bony Laminæ* in the Inſide of the *Bag*.

Fig. 65.

Fig. 65. *a a a a*, The *Sternum Bone*. *B*, Its ſuperior Part. *C*, Its inferior Part. *D D*, Its Right-Side. *E E*, Its Left-Side, in which the *Cartilages* of the *Ribs* *G G*, were wanting. *H H*, The Place of the ſame *Bone* worn off by the *Aneuriſma*.

A Communication of the Ductus Thoracicus, *with the* Emulgent Vein; *by M.* Pecquet. *n*.25. *p*. 461.

XXIV. In the Diſſection of a Woman, who died ſome few Days after ſhe was brought to Bed, M. *Gayant* having diſcovered the *Ductus Thoracicus* upon the 7th and 8th of the *Vertebra's* deſcending from the Back, inſerted a Quill into the ſaid *Ductus*, and having tied it upon the Quill, he did blow into it: Whereupon the *Ductus* was filled with Wind from the Quill unto the *Subclavial Vein*. This Wind iſſued at the *Aſcending Cava*, which had been cut: To prevent which, I compreſſed with my Fingers the *Vena Cava* and the *Ductus Thoracicus* together, and M. *Gayant* having blown afreſh into it, we perceived that the *Emulgent Vein* was, on the Left-ſide, filled with Wind,

and

and that thereupon the Body of the *Vena Cava* alſo filled itſelf from the *Emulgent* into the *Iliaques*. This Wind ſeemed to us to come from the Left *Kidney*, and to inſinuate itſelf into the *Emulgent Vein*, and thence into the *Cava*. To clear this the more, we lifted with the Hand the *Lungs* that filled the Left Cavity of the *Thorax*, and having cleanſed this *Cavity* with a Spunge, M. *Gayant* did blow into the *Ductus Thoracicus*, whilſt I compreſſed the *Vein* and the *Ductus* with my Fingers upon the 3d *Vertebra*, deſcending from the Back: And we ſaw the Wind inſinuate itſelf under the *Pleura*, by a Trace, which raiſed it ſuddenly as often as we did blow. This Trace appeared from the 4th *Vertebra* deſcending into the *Diaphragm*, and made us conclude that there were under the *Pleura* a Channel of Commerce coming from the *Ductus Thoracicus*, and paſſing to the *Emulgent Vein* by this Cavity of the *Thorax*.

Vid. *in Sect.* XXV. 2. *F.* This Channel of *Communication* we perceived to come from the *Ductus Thoracicus*, at the Place of the 4th *Vertebra* of the Back. But to be ſurer of it, I compreſſed with my Fingers the *Ductus* upon the 5th deſcending *Vertebra* of the Back; and M. *Gayant* having blown into the Quill, which was upon the 7th, the Wind paſſed not to the *Kidney*, nor to the *Emulgent Vein*; which made us conclude, that the *Communication* was not beneath the 5th *Vertebra*. Then I compreſſed with my Fingers the *Ductus Thoracicus* and the *Vena Cava* upon the 3d deſcending *Vertebra*; and the *Emulgent* ſwelled, when M. *Gayant* blowed into the Quill: Which gave us more ſtrongly to believe, that the Place of the *Ductus Thoracicus*, whence goes the Channel of *Commerce* with the *Emulgent*, was between the 3d and 5th *Vertebra* of the Back. And to be the more aſſured thereof, M. *Gayant* ſplit the *Ductus Thoracicus* upon the 3d *Vertebra* of the Back, and having blown into it at the Quill, the Wind came out at the *Axillary Vein*, and the *Aſcending Cava*; but the *Emulgent* ſwelled not at all.

Blood *paſſeth where the* Air *will not.* We alſo made the following Experiment, which ſeemed very curious. M. *Gayant* having blown into the *Aorta*, whereof all the Branches that had been cut were tied up, it ſwelled immediately, and the *Emulgent Artery* grew Tumid at the ſame Time: But the Wind that was protruded thorough the *Emulgent Artery* into the Left *Kidney*, returned not into the *Emulgent Vein*; which taught us, that the *Blood* often paſſeth where the *Air* does not. For the *Blood* of the *Emulgent Artery*, which goes to the *Kidney*, returns thorough the *Emulgent Vein* in the *Vena Cava*, purſuant to the Rules of the *Circulation* of the *Blood*: But in this Experiment the *Wind* could not paſs that Way. And we had another Proof thereof in the *Lungs* of a Woman which we formerly diſſected, where we ſaw, that the *Air*, which was propelled thorough a Quill into the *Vena Arterioſa*, which is the *Artery* of the *Lungs*, returned not thorough the *Arteria Venoſa* (which is the *Vein* thereof) into the left *Ventricle* of the *Heart*, though by the *Circulation* the *Blood* paſs there with Eaſe; and even *Milk*, which having been let in by this *Vena Arterioſa*, returned eaſily the ſame Way.

A Communication between the Ductus Thoracicus *and the inferior* Vena Cava; *by M.* Pecquet: *n.* 85. *p.* 5007.

XXV. 1. The Diſcovery made about 20 Years ſince by M. *Pecquet* of the *Ductus Thoracicus*, ſeemed not ſufficient to clear up all the Difficulties to be met with in the new Opinion, which this Channel hath occaſioned, concerning *Sanguification*.

It might be ſaid, among other things, that there appears no Reaſon why Nature ſhould carry the *Blood* into the *Subclavials*, and thence make it deſcend by the Trunk of the *Vena Cava* (*A*) unleſs it be to keep the *Chyle* from entering all at once, and altogether pure, into the *Heart*; and that the Mixture which is made of the *Chyle* with the *Blood* along this Way, may diſpoſe the *Chyle*, by a Kind of contagious *Fermentation*, the more eaſily to receive the Character of *Blood* in the *Heart*: But that this might be more conveniently done, the *Ductus Thoracicus* being inſerted into that Trunk of the *Vena Cava* which aſcends to the *Heart*, becauſe that this Way is ſhorter, and is equally favourable to this Commixture.

It might alſo be objected, That ſuppoſing this Commixture were of Importance, the *Ductus Thoracicus* ſhould communicate with the inferior Trunk of the *Vena Cava*, as well as with the ſuperior, to the End that the Moiety of the *Chyle* being mixed with the *Blood* that comes from on high, and the other Moiety with the *Blood* that comes from beneath (*B*) it might the more eaſily be *altered* by this Commixture. And this Objection ſeemed the more rational, becauſe it being very likely that the *Blood*, which returns from the Parts in which it hath received ſome Impreſſion in penetrating their Poroſities, communicates to the *Chyle* theſe ſame Diſpoſitions, there was reaſon to deſire, that the *Blood* which reaſcends, might in ſome Degree impreſs the peculiar *Character* of the inferior Parts, as that which comes from the upper Parts impreſſes upon it that which belongs to it. (*C*) Add hereunto, that the *Blood* which reaſcends to the *Heart*, muſt be more perfect than that which deſcends, becauſe it comes from being purified in the *Liver*, *Spleen* and *Kidneys*; ſo that it is capable to give (*D*) to the *Chyle* good Impreſſions. (*E*) Laſtly, it might be ſaid, that, ſuppoſing it be neceſſary that not only a Proportion of the *Chyle* paſs through the *Heart*, to give it ſome Kind of Refreſhment, but alſo that all the *Chyle* be conveyed thither for to be converted into *Blood*; the ſmall Orifices, which the *Ductus Thoracicus* hath in the *Subclavials*, ſeem not to be large enough for that Purpoſe.

The Obſervations that have been lately made, by ſearching carefully the Paſſage of the *Ductus Thoracicus* in the Body of a Woman, did ſhew, that theſe Difficulties were well grounded. For, it hath been found by divers Experiments, made about this Matter, that there aſcends at leaſt ſo much *Chyle* through the Trunk which is beneath the *Heart*, as there deſcends thro' that which is above it.

Vid. Sup. Sect. XXIV.

Theſe Experiments confirm thoſe which were made ſome Years ago, and are clearer and ampler than the former. For the *Communication* which the firſt Time appeared to be only with the *left emulgent Vein*, hath been found this ſecond Time not only with this *Vein*, but alſo with the two *lumbary Veins* which are inſerted in the Trunk of the inferior *Vena Cava*. The Manner of finding this *Communication* was thus: After there had been ſhewed the *Commerce* of the *Ductus Thoracicus* with the *Right Ventricle* of the *Heart*, by an Injection of *Milk*, which having been ſyringed into the Beginning of this Channel, iſſued in great Quantity through this *Ventrick*, we tied the Trunk of the *Vena Cava* above the *Heart*, ſo that nothing might paſs that way; and the Trunk of the *Emulgent* and that of the *Vena Cava* having been opened above, longwiſe, ſome *Milk* ready to boil, was *(G)* injected into the *Emulgent* through the *left Lumbary Vein* (which we have ever obſerved to come from the *Emulgent*) and at the ſame time we ſaw it come away through the other *Lumbary*.

This Experiment having been ſeveral Times repeated without our being able to ſee the Track, which we had formerly obſerved under the *Pleura*, we reſolved to attempt a more eaſy, and more certain Method of diſcovering this Branch, than the uſual Diſſection of the Veſſels *(H)*. This Way was to ſyringe into the Trunk of the *Ductus Thoracicus* a Compoſition that might run into it being hot, and which, by being refrigerated, might become ſolid enough to afford a greater Facility to follow and trace the Channels, in the Cavity of which it ſhould be thus hardened. And this Deſign ſucceeded in Part: For the Compoſition filled the whole *Ductus Thoracicus*, and aſcended as far as into the *Subclavial*; but there paſſed nothing into the Channel that makes the Communication ſought for, though Care was had to warm the ambient Parts by ſeveral Injections of warm Milk, to the End that the Compoſition might not harden before it had penetrated into all the Conduits: We alſo tried to inject the ſame Compoſition through the *Lumbary* that iſſues out of the Trunk, if its *Valves* would permit it; but they ſtopped all that we endeavoured to make paſs that way, and neither the Milk nor the Wind would ever enter there. (*I*) By this Contrivance we very diſtinctly ſaw the Figure and the whole Structure of the *Ductus Thoracicus*, and we found, *that* that *Ductus* did aſcend unto the Right-ſide of the *Heart*, keeping one and the ſame Size, which was no more than $\frac{1}{12}$ of an Inch; *that* afterwards it was enlarged to $\frac{1}{6}$ of an Inch in *Diameter*; *that* in this Enlargement its Tunicle on the Right-ſide of the *Veriebræ* was, as it were, pierced by 4 ſmall Holes, diſtant $\frac{1}{12}$ of an Inch from one another, and all diſpoſed in a Row; into which Holes the ſaid Compoſition had not been able to penetrate; *that* the ſame *Ductus*, after having re-taken its firſt Size, had two Appendixes faſhioned like Sacks; *that* there was yet a 3d Appendix beneath the Dilatation; *that* the firſt and higheſt Appendix was of the Form and Bigneſs of a ſmall *Phaſeolus*; *that* the 3d, which was beneath the Dilatation, was like to the 2d; that they had a ſtreight Orifice, and *that* the laſt was full of *Chyle* conſpiſſate, ſo that the Compoſition could not enter there, as it had done into the other.

Annotations; Dr. Needham. *Ibid.*

2. *A*, This Reaſon for inſerting of the Trunk of the *Ductus Thoracicus* into one Place alone, is as good as any that are afterwards given to prove the contrary. For all Proofs of this Nature are but looſe Conjectures at beſt; the Matter admitting of no other Demonſtration than what is *ocular*.

B, Till the lower Inſertion be ſhewed, we are bound to believe that Nature thought the ſingle Commixture of *Blood* and *Chyle* ſufficient. The Reinforcement of that Objection anſwers itſelf, being propoſed in no other Terms than (*it ſeems very likely*) the whole Conjecture, having yet but very ſlender Foundation in Philoſophy. And if there be any thing in the Notion of impreſſing *Characters*, it is more attributeable to the *Lympha*. See beneath at *D*.

C, That the *Blood* which re-aſcends to the *Heart*, is purer than what deſcends from the *Head*, *&c.* it is a Notion that will not eaſily be granted; neither can it be made out by Experiment. I had myſelf compared the *Blood* of the *Jugular Vein* with that of the *Crural* in a Dog, and found no Difference. The Separations made by the *Kidneys* and *Liver* (if they prove any thing) prove the aſcending *Blood* to be thicker than the deſcending, it having loſt in thoſe Places much of its *Serum* and *Lixivial Salts*, which are the great Inſtruments of Attenuation. But withal it is to be conſidered, that the *Blood* which aſcends from the *Heart* to the *Head*, parts with much Excrement in the *Glandulæ Salivales*, and Noſtrils, and the whole Throat; the Quantities of which are much greater than will eaſily be imagined. There is likewiſe a great Separation made in the *Brain*; which whether it be of the pureſt and beſt *Spirits* of the *Blood*, ſo as to leave it depauperated, or only of a *nutritious Serum*, ſuch as is made in all the ſolid Parts, is hard to ſay. Only this may be certainly ſaid, that the *Lympha* does wholly exonerate itſelf into the *Subclavial* and *Jugular Veins*, near the Place of the Inſertion of the *Chyle*; whereby the whole *Chyle* is diluted, and the Mixture of it and the *Blood* facilitated. Which very *Phænomenon* is a greater Argument to prove, that the *Chyle* does wholly enter by that Paſſage, than any can be produced on the other Side: For we ſee all the *Lympha*, not only of the *Liver* and *Inteſtines*, but alſo of the lower *Limbs*, to pour itſelf into the *Receptaculum Chyli*, and not into any of the lower *Veins*: Whereas the *Lymphaticks* of the *Head*, *Neck* and *Arms*, think it ſufficient to meet the *Chyle* at the Place of its Entrance; which ſame thing might have been done by the lower *Lymphaticks*, had they any *Chyle* to meet; the principal Uſe of the *Lympha* ſeeming to be, to ſerve the Uſes of the *Chyle* and its Mixture with the *Blood*.

D, What *Impreſſions* are made on the *Blood* by the *Liver*, *Spleen*, *Kidneys*, *&c.* is uncertain; but if there be any ſuch made, the *Liver* and *Kidneys* do ſo readily exonerate themſelves into the *Vena Cava*, that the *Impreſſions*, be they what they will, are quickly conveyed to the *Heart* without any great Diminution of them. And whereas the Author mentions the *Characters impreſſed* from Parts, thoſe (if any ſuch be) may more juſtly be ſuppoſed to be conveyed in the *Lympha*, which Liquor ſeems to be a Product of thoſe Parts curiouſly elaborated in the very Subſtance of them.

E, What is ſufficient and not ſufficient, muſt be judged of by Nature, and not by us. Yet if we conſider the Time that is ſpent in carrying the *Chyle* up into the *Blood*, it is eaſy to believe, that a much greater Quantity of Liquor may be diſcharged by that *Ductus*, than is uſually pretended to.

F, What thoſe Experiments are, we ſhould be glad to know. But the Experiment of 1667 (if I rightly remember it) was only a *Luſus Naturæ*, found by M. *Pecquet*, which I therefore call ſo, becauſe neither he, nor any

Vid. Sup. Sect. XXIV.

one elſe hath found it ſince: Whereas the *Vaſa Lactea*, and the Ways of ordering them, are ſo well known, that if any ſuch thing were, it could not long be hid.

G, An Injection into the *Lumbary Vein*, with its Effects mentioned, can prove nothing but the *Inoſculatio* of the two *Lumbary Veins* with each other; which is acknowledged to be ſuch in all the *Capillary* Veſſels of the ſame Kind, *viz. Veins* with *Veins*, and *Arteries* with *Arteries*. But the Thing required here is, the Paſſage from the *Receptaculum* to the *Lumbary Vein*, or to any other *Vein* beſides the *Subclavial*.

H, The Way of Syringing a Liquor which is apt to *Coagulation*, into the *Ductus Thoracicus*, *&c.* I think to be needleſs and unprofitable as to this Inquiry, when there is a more eaſy Experiment to be made, which is more demonſtrative, *viz.* Open a Dog at a convenient Diſtance of Time from his Feeding, and then tie a Ligature upon the *Ductus Thoracicus* nigh the *Subclavial*, your *Receptaculum Chyli* will continue full 48 *Hours*, or longer if you pleaſe: So that if there be any ſuch *Ductus*, it muſt remain likewiſe full with its own natural Liquor, and be all that while viſible. But if there were any ſuch *Ductus*, it would in a Quarter of the Time empty the whole *Receptacle*; whereas upon a Ligature you'll find the clean contrary, *viz.* all the *Lacteal Veſſels*. (that are acknowledged to be ſuch) fully diſtended: Which is a full Demonſtration, that they have no Way of Evacuation by any other *Duct* than the *Thoracique*.

I, The other Uſe of the *Coagulating Injection* I applaud; though the ſame may be done by the Ligature aboveſaid. However, the Event of the Experiment, made by the Learned *Pecquet*, makes againſt the Opinion of a *new Ductus*, and not for it.

The true Uſe *of the* Lymphatick Veſſels; *by M.* Louy de Bils. *n.* 40. *p.* 791

XXVI. The *Lymphatick Veſſels* have two *Coats*, betwixt which there are innumerable very ſmall and very fine Filaments, reſembling the Moſs of Trees without any *Valves*, containing a *nutritious* Juice conveyed into all the Parts of the Body, by a Motion thereof from the Centre to the Circumference; but returning through the inner Pipes (furniſhed with *Valves*) of the ſame *Water Veſſels*; at which time it is no more to be called *Water* or *Dew*, but *Ferment*, the Veſſels alſo deſerving the Name of *Ferment Veſſels*. This *Ferment* ſerves to help the *Blood*, and to *ferment* the ſame, being conveyed into it by a Motion contrary to the former, *viz.* from the Circumference to the Centre; which I have ſhewed to many in the *Jugular Glandules* taken out of a Dog; wherein I ſhewed them, that theſe *Lympatick Veſſels* carry their *dewy* Particles about the *Glandules*, between the two *Tunicles*, and that in the lowermoſt End of theſe *Glandules* the *Ferment Veſſel* takes its Beginning, being encloſed in theſe *dewy Veſſels*, and ſo conſtituting the inner Pipe together with the *Valves*, which are of another Form than hath been known hitherto.

To your *Quære*, Whether the ſaid *Ferment Veſſels* diſcharge at laſt all their *Ferment* into the *Ductus Thoracicus*; thence to be carried directly into the *Heart*, there to increaſe and to *ferment* the *Blood*; or whether they communicate their *Ferment* to other Parts alſo? I anſwer, that moſt of the Juice of the *Milky Veſſels* is diſcharged between the *Tunicles* of the *Veins*, *Arteries*, *Lymphaticks*, *Membranes*, and the *Veſſels* in the *Meſentery*, to be conveyed into all the Parts of the Body, both Internal and External. For even in *Bearing Females* the *Fruit* is not nouriſhed by any *Blood*, but by the *nutritious Juice* conveyed to it; as alſo by the *Moiſture* contained in the *Amnion*, which is no *Urine* nor *Sweat* as ſome imagine; we having lately ſeen in the Houſe of Dr. *Stalpart* at the *Hague*, in a new born *Child*, that his *Urachus* had no Cavity at all, through which the *Urine* could paſs out of the *Bladder* into the *Amnion*. The remaining and leaſt Part of the *Liquor* of the *Milky Veſſels* is tranſmitted through the *Ductus Thoracicus* by the *Jugular Vein* into the *Blood*.

Beſides theſe *Veſſels*, there are yet others that do not exonerate themſelves into the *Blood*, *viz.* the *Ductus Virſungianus*, which delivers itſelf into the *Duodenum*; and the *Ductus Salivales*, whereof the *Saliva* does no leſs, than the *Juice* in the *Ductus Virſungianus*, ſerve for *Ferment*, *viz.* the one in the *Stomach*, and the other in the *Inteſtines*. From whence you may eaſily conclude, not that I hold (as it ſeems I have been underſtood) that the leaſt Part in the *Ferment Veſſels* concurs to the making of *Blood*, but that the leaſt Part of the *Juice* in the *Milky Veſſels* is diſcharged into the *Blood*.

Concerning the other *Quære*, Whether alſo the Diſtribution of this *Ferment* is made through the *Teſticles*, *Kidneys*, *Breaſts*, and *Salival Glandules*, *&c.* I anſwer, That the *Salival Glandules* carry their *Spittle* or *Ferment* into the Mouth; and that the reſt which returns back through the *Teſticles*, *Breaſts*, and other *Glandules* is carried to the *Ciſtern*.

A convulſive Rheumatiſm; *by Dr.* Rob. Pitt. *n.* 208. *p.* 58.

XXVII. The Subject of this Paper was a Man of about thirty-five Years of Age, ſtrong, of a *bilious* Habit, buſied at the Time he was taken ill in gathering the Tithes, and by expoſing himſelf to the Cold, after violent Labour, had probably the Pores of his Body too ſuddenly locked up. In the Beginning of the Diſeaſe he had a *Fever*, which came on with a Rigor, ſucceeded with Heat and wandering *Pains*, at firſt in the *Stomach* and *Inteſtines*, and ſoon after in the *Breaſt*. But theſe *Symptoms* were ſoon changed for others, the morbifick Matter falling entirely upon the *Back*, whence a violent *Pain* in the *Loins*, reaching as far as the *Hip*, and the Torment was ſo exquiſite as to make the *ſymptomatick Sweats* run down from his *Hair* and *Face*. It would neither allow him to lie in Bed, ſtand erect, nor ſit, but preſſing his Belly againſt the Side of the Bed, with his Feet upon the Ground, by that Compreſſion the Pain of his Loins ſeemed to be a little eaſier. But even with his Body thus inclined, he could not remain quiet as he wiſhed to do; for being ſeized with Convulſions, he was firſt raiſed erect, with a rueful Countenance, and diſtorted Mouth, then he fell down upon the Ground, (unleſs there happened to be ſomebody by to prevent it) where he lay like a dead Perſon, unable to move himſelf, and as uncapabale of riſing as if he was an Infant. Thus proſtrated, his Arms and Legs became ſtiff; ſo as it was not poſſible either to bend or extend them. His *Mouth* too was ſhut ſo cloſe with *Convulſions* that it would ſcarce admit a Spoon. But theſe *Convulſions*, with which his *Back* and *Limbs* were ſeized, returned by *Paroxyſms*, not periodically indeed, but ſometimes ſooner and ſometimes later, according as the *Pain* was more or leſs violent. But let us bring him back again to that Poſition in which he found the moſt Eaſe, *viz.* the *Bed-ſide*, where he had ſuch a grave ſolemn Look, as would have made any Body laugh to ſee him, if the Remembrance of the Miſery he ſuffered had not rather excited Pity. Thus this wretched Man was tormented Day and Night, for about the Space of *three Weeks*, never lying in Bed, without Sleep almoſt the whole Time, from the exquiſite *Pain* and frequent *Convulſions*. Theſe were all the Symptoms which I could obſerve about him, otherwiſe he was well. He had no *Reachings*, the *Pulſe* was ſtrong and equal, the *Tongue* moiſt and covered with a white *Scurf*; his *Blood* was like that of a *pleuretick* Perſon, and his *Urine* like that of a Perſon in Health. What was done for him the firſt Week I cannot ſay, except that he was once blooded, had one *Glyſter* and *Doſe* of *Phyſick*, and a ſufficient Quantity of *Laudanum* without any Effect. But all was in vain. At length I was called in, and as ſoon as I ſaw him in the Condition above deſcribed, I immediately ordered him to be plentifully blooded. Next Day I ordered a *Lenitive* for him, and after it had operated three or four Times, he could walk upright without Pain, and was free from Convulſions. But after it had done working the *Pains* and *Convulſions* immediately returned, and he to his former Situation the Bed-ſide. This however gave ſome Hopes, that by repeated Purging the Diſeaſe might be carried off, as the firſt *Doſe* of *Phyſick* had produced ſuch a Truce. The following Day, therefore, I ordered him *Reſine* of *Julip*, and ſweet *Mercury*, (as I had experienced the good Effects of this Medicine in Pains of the Loins) but contrary to Expectation he had not one Stool, though I added an Ounce of the Syrup of *Buckthorn* to the above. In order then that the Wedge might be ſufficiently hard for the Knot, I increaſed the Doſe of the Purge, making him take three or four *Ounces* of the *Syrup* of *Buckthorn*, every other Day. By this means his Belly was at laſt opened, and the Pains became gentler, and the *Convulſions* leſs frequent. I allowed him to drink as much *Whey* as he had a mind to; and after he was well purged, I could venture to give him *Laudanum* more ſafely, and in greater Quantity, in order to compoſe the Spirits, much diſturbed both by the Diſeaſe and Medicines, and without locking up or confining the morbifick Matter. Thus, at laſt, by repeating theſe *Purges*, eight or ten Times, the *Pain* and *Convulſions* both went off, and he quite recovered. In the mean time, to prevent a Relapſe, I ordered ſome Nervous Medicines for him, to reſtore freſh Vigour to the Blood and Spirits: And I ſaw him lately very well, carrying a Burden upon his Shoulders. I had almoſt forgot to mention, that when he was recovering the Calves of his Legs ſwelled, but this yielded very eaſily to the laſt mentioned Remedies.

The probable Cauſes of the Pain *in* Rheumatiſms; *by Dr.* Edw. Baynard. *n.* 215. *p.* 19.

XXVIII. Dr. *Baynard* was always of Opinion, that the *Pains* in a *Rheumatiſm* were not cauſed from any *ſaline* or *acid* Particles in the *Blood*, &c. but rather from the *Clammineſs* and *Denſity* extending the Channels through which it paſſes, which Extenſion produces thoſe ſharp and pungent *Pains*, which

Rheumatick Perſons ſo generally complain of. For although the proper *Coats* of the *Veins* and *Arteries* ſeem to be *indolent* in themſelves, yet thoſe thin *Membranes* which obſide them are of moſt exquiſite *Senſe*, and full of *Lymphæ-ducts*, which being dilated and ſtretched, cauſe an *Inflammatory Symptomatical Fever*, with continual *Sweats*, the *Blood* being *Glutinous* and *Sizey*, as in *Quinſies* and *Pleuriſies*, and all other *Inflammatory* Diſtempers: The *Fever* being increaſed by the great Store of *Alkalial Corroſive Salts* lodging in the *Blood*, cauſing Thirſt, *&c.* and not diluted and waſhed off by *Urine*, which *Urine* is always thick, turbid and high-coloured, and almoſt, if not totally, devoid of any *ſaline* Impregnations. To prove which, he ſent 6 *Quarts* of a ſtrong Man's *Urine*, in the Height of a *Rheumatiſm*, to that ingenious Artiſt M. *George Moult*, who chemically Anatomized it, and found not above the 30th Part of thoſe *Salts* uſually found in ſuch a Quantity of the *Urine* of a *ſound Perſon*.

The Pneumatick *Engine applied to* Cupping-Glaſſes; *by Mr.* Tho. Luffkin.
n. 255. *p.* 288.
n. 259. *p.* 408.
Fig. 66.
Fig. 67.
Fig. 68.
Fig. 69.

XXIX. Let *A B*, be a hollow Braſs Cylinder, of a proper Thickneſs, whoſe Diameter is one *Inob* and its Length ten or twelve *Inches*; internally let it be poliſhed as fine as poſſible, ſo as there may not the leaſt Chink remain; and near its Bottom let there be a little Foramen *O*. Further let there be a Lid or Cover to it *E F*, (*Fig* 67). and the Bottom *G H*, (*Fig.* 68) the firſt faſtened to the *Cylinder* by two Screws, and the other by a metallick Cement. To the Bottom add the Note 1, 2, perforated in the Middle, and the external Part of it, after the manner of a Screw. Set the iron Rod *N N*, (*Fig.* 69.) of a proper Thickneſs, and of the Length of the Cylinder. At the Extremity of this let there be a Braſs Plate *L M*, and two *Inches* higher up another *I K*, and the Space between filled up with Threads of Lint oiled, ſo as exactly to fill up the Cavity of the Cylinder. To theſe muſt be added too the Handle *H*. And now you have an Inſtrument not unlike a Surgeon's *Syringe*. Let there be made likewiſe the Braſs Cylinder *O P Q R*, (*Fig.* 70.) equal to the Size of the Figure, with two Wings *O S*, *P S*, perforated through its Axis with a large Hole, ſo as entirely being formed like a female Screw, the Male Screw of the Noſe may be exactly received in it. Let the *Foramen* be enlarged from *R* and *Q*, as far as *T T*, then make a Shoulder *V V*, and a Plate *W*, perforated in the Middle, ſo as to be adapted and faſtened to the Shoulder. Beſides, let there be made a ſtreight Cone perforated through the Axis, 1, 2, 3, (*Fig.* 71,) and let the *Foramen* be enlarged from 1, 2, as far as to 4 4, then make the Shoulder 5 5, ſo as exactly to fit the Cavity of the Cylinder *T T*, and ſtick firmly to it, and then make the Spring (*Fig.* 72.) of a Braſs Wire winding in a ſpiral Manner round the Cylinder, of a ſufficient Strength, and almoſt equal to the Diameter of the Cavity, 4 4 *V V*, only a little higher when it is left to itſelf, and let it have at its lower Extremity the Plate 7 7, of the ſame Diameter covered below with a Bit of ſoft oiled Leather, to ſhut up the Orifice of the Tube. Again, at the Top of the *Cupping-Glaſs* (*Fig.* 73.) make a round Perforation, into which put the Cone as far as the Wings *S S*, and let the Chinks or Fiſſures be filled with a Cement compoſed

Fig. 70.
Fig. 71.
Fig. 72.
Fig. 73.

Fig. 74.

poſed of Roſin, Turpentine, and Quick-Lime; and laſt of all make the Stopper 6, 7, 6, 7, (*Fig.* 74) covered with oiled Leather at the Shoulder 7 7, whereby the Air, as ſoon as it is drawn out of the Glaſs (if there ſhould happen to remain any Fiſſure at the Valve) may be excluded. Thus far concerns the Deſcription of this Inſtrument; now I do not proceed to its Uſe and Application in Diſeaſes, becauſe that belongs properly to Phyſicians and Surgeons; I ſhall only add a few Things concerning the Manner of uſing it. The Thumb being cloſely applied to the *Foramen*, the Plate 9 9, (*Fig.* 75) is pulled up by the Handle to 10 10, but as the Air before filled only the Space 9 0 9, now it is ſo much rarified, or expanded, as to occupy the Space 9 9 10 10, that is three hundred times more; wherefore the Elaſticity of the Air included in the Glaſs, overcoming the Elaſticities of the Spring and Air included in the Cylinder, the Plate or Valve will be forced upwards, and remain open till ſuch a Quantity of Air ruſhes into the Cylinder from the Glaſs, as to make the Elaſticity of the Compliment of Air in the Glaſs, equal to the Elaſticities of the Spring and Air now contained in the Cylinder; but the *Foramen* O being open, the Valve *i*, will be cloſe ſhut up by the Preſſure of the external Air, *cæteris paribus*, according to the Force of the Spring and the Proportion which the Capacity of the Cylinder bears to the Capacity of the *Cupping Glaſs*. At three or four Suctions there will be exhauſted $\frac{999}{1000}$ Portions of Air, more or leſs. Now although the Elaſticity of the Air, occupying the ſame Space, be according to the Quantity, yet the Reſiſtance or Preſſure of the Air, upon the Skin, under the Glaſs, will be to its Preſſure upon the neighbouring Parts, as one to a Thouſand; becauſe, before the Air was exhauſted from the Glaſs, the Reſiſtance or Preſſure upon the Part under the Glaſs, was the ſame as that upon the Parts without the Glaſs. I think it is worth obſerving, that the larger the Cylinder is, with a Spring of the ſame Force, the greater will be the Quantity of Air exhauſted from the Glaſs; becauſe the Air 9, 0, 9, is extended in a larger Space, and conſequently has leſs Elaſticity; wherefore the Elaſticity of the Air in the Glaſs, bears a greater Proportion to the Elaſticity of the Spring and Air contained in the Cylinder, and therefore a greater Quantity of Air will be extruded.

The Operation *of a* Bliſter *when it cures a* Fever; *by Dr.* Wil. Cockburn. *n.* 252. *p.* 161.

XXX. There is hardly any one who has not ſeen a *bliſtering* Plaiſter, the great Ingredient whereof are *Cantharides*, laid upon a fleſhy Part, and after ſome Time, obſerved the *Scarf-skin* forced up with a Liquor, that oozed and iſſued out from within the Sphere of Activity of that Plaiſter: And if we conſult the moſt of *Phyſick* Books, the Account is no better. Little or nothing more is ſaid, even by Authors of the firſt Form, than any one may obſerve every Day; ſuppoſing only that he thinks that our Fleſh, thus covered at any time with a *Bliſter*, is made up of many and divers Veſſels out of which the diſcharged Water may come. I have therefore endeavoured to find a reaſonable Account, *how the raiſing of Bliſters may cure a Fever and its moſt terrible Symptom the* Delirium, *and that in* 6, 8, *or* 10 *Hours.*

To this End, I *firſt* employed *Microſcopes* to look on the *Fly*, and its Powder, and to ſee if I could diſcover any *ſharp Inſtrument* in theſe warlike and wounding Creatures. But the *Fly* became a very delightful, but too large a Survey for me; and the Powder begot nothing for my Sight but a dark Cloud; and whatſoever elſe I found, I could meet with no *Arms*. I then turned half a *Pound* of *Cantharides* into a *Retort*, and there came over with the leaſt Sand-heat, and in a very ſhort time, vaſt Quantities of Bodies ſo very ſmall, that I was not able to diſcern their Shape. And though I proceeded in the uſual Way, on the like Occaſions, the whole Operation was performed very *ſoon*, and ſo *haſtily*, that very little *Salt* ſtuck to the Neck of the *Retort*, and the *Volatile Salt* ſhot in moſt delightful *Chryſtals* in the *Receiver*. And of the whole 8 *Ounces* of *Cantharides*, there were only two *Ounces* and 5 *Drams* left as a *Caput Mortuum* in the *Retort*. When the *Liquor* came to be purified, the ſmalleſt Heat brought it over ſuddenly, *Oil*, *Salt* and *Spirit*; ſo that they could not be parted, till by a repeated Operation with *Brick-duſt*. I mixed the *Spirit* with *Salt* of *Wormwood*, *Spirit* of *Harts-horn* and *Sal Armoniac*: But it did not *ferment*, contrary to the Expectation of moſt Authors. Then I turned it over upon *Spirit* of *Vitriol*, where it did *ferment* very ſtrongly, and yet better with *Spirit* of *Nitre*; with which alſo I did mix the *Spirits* of *Sal Armoniac* and *Harts-horn*; but they neither *fermented* ſo long, nor with ſo great an *Ebullition*: From whence it is evident, that it is not only *Alkaline*, but a great deal more than any one of theſe I have now mentioned.

The *internal Uſe* of theſe *Flies* in Phyſick having been lately controverted with much Heat, I ſhall here give ſome *Hints* whereby to ſtate the Queſtion fairly; and ſuch as if uſed as Topicks in the Controverſy, will ſoon put an End to it among thinking and ſober People. The great Thing challenged is this, That we may ſee *Cantharides*, which have been reputed *Poiſon*, now ſo *corrected*, that they become not only innocent, but prodigious Inſtruments of Health. For the clearing of this, firſt ſettle what a *Poiſon* is; and next, ſince *Death*, or no *Circulation* of the *Blood*, is its Conſequence, we muſt find as many Kinds of *Poiſons*, and Ways of *dying* natural, as there are Ways of ſtopping the *Blood's Motion* in the Courſe of Nature, or by Medicine; which is either, by its own *Rarefaction* to a Degree, its *Coagulation*, or laſtly, by *letting it out* in ſuch a Quantity that the remaining Part gives not animal *Actions*; and as all, or any of theſe, may be *ſudden*, or produce their Effects in *Time*, we ſhall have *evident Poiſoning* or *Poiſoning* for a *Time*; of which we have many Hiſtories. Again, it may be aſked, Of which of all thoſe *Cantharides* are? And of all I believe they may be found entirely or moſt eſpecially of the third Sort. After this, we ſhall be led naturally to enquire, if they be *corrected*, or, in plain *Engliſh*, if they have left their *wounding Power*; and this is the Fact, of which we may inform ourſelves, by applying a *Plaiſter* of *Cantharides* ſo *corrected*, to a Place expoſed to *Air*. This will ſettle the Fact of *Correction*, and in Circumſtances much to the Advantage of the *correcting* Side, becauſe there the *Skin* and *Veſſels* are much harder than thoſe to be met with within the Body; and if they *bliſter* then, much more when *internally* given. The Poſſibility of their being *corrected*, and of their becoming uſeful, may not be doubted of: But then it is our Reaſon, in this Way, that muſt be Judge. Add to all this the common Obſervation, that a common *Bliſter* ſometimes makes *Bloody Urine*, and compute what Quantities enter the *Plaiſter*, and then what Quantities of ſmall Parts may be ſent from them that are thus mixed; next calculate what probable Diſtribution may be made of theſe Parts to the *Kidney*; and then you'll find that Parts that are nearer, and as ſuſceptible, muſt be *wounded* too, and produce all the ill Effects that are ſuppoſed, and commonly ſeen. But if all this can happen by ſo ſmall a Quantity of the *Powder* that goes to the *Plaiſter*, and is confined by other *viſcid* Ingredients of it, what muſt be the Conſequence of this *Powder* when it is taken inwardly, and in Subſtance? But it is *corrected*, and we are told with *Camphire:* The moſt unfit *Corrector*, ſo far as I can expect in Reaſon, or even imagine. But ſtill our Reaſon may be frail; and ſo it may, and really is ſo, to a great Degree: But then to help it, I had two *Plaiſters* applied, each of them with *Cantharides*, and one of them with as much *Camphire* as *Cantharides*. The next Morning we found that *Plaiſter* wherein the *Cantharides* were mixed with *Camphire*, to have quite as good Effects as the other where there was none. The Conſequence of which is, that if *Cantharides* ſaid to be *corrected* make a *Bliſter*, when applied to any external Part of the Body, that they are to be thought not to be *corrected*.

But leaving theſe Particulars, I ſhall proceed to prove the Way of a *Bliſter's* working when it *cures* a *Delirium*, and a *Fever*. And here I ſhall only ſuppoſe,

1. That there are very *Mobile* or *Volatile* Parts in *Cantharides*, &c. that can be determined into our *Fleſh*, with a Force ſufficient to make their Way thorough the Sides of any *Veſſels* that are in the *Lines* of their *Direction*, ſo long, and in that Proportion, that their *impreſſed Motion* does continue.

2. That all Sorts of *fluid Bodies* contained in the Cavities and Channels of theſe Veſſels, may be tranſmitted, according to the Conditions of Separation of *fluid Bodies* running in Veſſels of that Sort, and the Wideneſs of the *Emiſſaries* made by the *wounding* Particles of *Cantharides*, or any ſuch like *bliſtering* Subſtance.

Next I ſhould proceed to make ſome Suppoſitions, from the Nature of a *Fever* and a *Delirium:* But that I may be better underſtood, I ſhall firſt hint ſome general Things about them.

Fevers, in reſpect of Time, either remain after the ſame manner, from the Sickening till the ſick Perſon is freed of his Diſeaſe, or not: If the firſt, they are called *continued Fevers*; but if the ſick Perſon continues evidently in a ſickly Way, and yet has great Reliefs, and is reſpited from his Illneſs for a Time, the *Fever* is ſaid to *intermit*, or that it is *intermitting*. Theſe Diſeaſes are perfectly well diſcovered by the *Quickneſs* of the *Pulſe*, which is the Fault of the *Pulſe*, and the *Pulſe* cannot be ſo but by the *Faultineſs* of the *Blood*, either in *Quantity*, *Quality*, or its *Motion*. Neither can it offend either in *Quantity*, or in *Quality*, but it affects its *Motion*. Hence we may ſuppoſe that a *Fever* is an univerſal heightened *Circulation* of the *Blood,* and that a *Delirium, h. e.* that unconnected, incoherent, and ridiculous Way of Imagination and expreſſing ourſelves in a *Fever,* is entirely the Effect of this greater *Motion.*

Theſe Things being ſuppoſed, the Queſtion may be ſtated thus; How *wounding* by *Cantharides* makes our *Pulſe* not ſo *quick,* and conſequently our *Blood* to have a more ſlow and natural *Motion?* That this great *Effect* does not proceed from the *Pain* of a *Bliſter* is evident; becauſe *Pain* very often brings a *Fever.* That the Particles of the *Cantharides,* mixed with the *Blood,* ſhould induce this Quiet by a peculiar Sort of *Fermentation* they make in the *Blood* is very precarious; for I have ſhewn in another Place, from Hints of an eminent *Member* of the *Royal Society,* and perhaps the greateſt *Chymiſt* that ever lived, that there is no ſuch thing as a *chymical Fermentation* in our *Blood.* And the Quantity of *Lympha* that is thereby ſeparated from the *Blood,* is acknowledged by moſt Phyſicians to be too weak a Cauſe for ſo great an *Effect.* I ſhall therefore proceed to enquire after a better *Solution* of this aſtoniſhing *Phænomenon.*

Vid. Sea-ſickneſſes; *Part* I. *p.* 47.

The *Pulſe* is nothing but the Side of an *Artery* that is diſtended by a certain Quantity of *Blood* that is determined through its Cavity, by a certain *Motion* every time the *Heart* is *contracted,* and that touches and beats up our Finger, when we lay it on a Place where we may be ſenſible of this Affection in the *Artery.* We ſay this *Pulſe* is more *frequent,* not ſo much that it beats *oftner* than any other Body's, but that it beats *quicker* in the ſame Perſon when he is ſaid to have a *Fever* than before, when he was reputed to be in perfect *Health*; ſo that a *Phyſician* is obliged to know the *natural Pulſe* of every Perſon, before he can judge by the *Pulſe,* that any one is *ſick.* And how that may be done I have ſhewed at Length, in a Book ſome time ago. Howſoever, in this our Caſe, the *Pulſe* is *quicker,* and there is no *Pulſe* but when the *Heart* is *contracted*; and the *Heart* being a *Muſcle,* and *contracted* at every *Pulſe,* is either the chief or only *Cauſe* that determines and ſtretches the Sides of *Arteries,* and makes a *Pulſe,* or a very extraordinary Meaſure of ſuch *Diſtenſions:* But it has the greateſt Share in propelling the *Blood* round the whole Body, in reſpect of the *Help* of the *Arteries,* which they are ſuppoſed to give by their *Reſtitution,* after their extrordinary *Diſtenſion.* Be it how it will, both their Actions are by *Contraction* (though afterwards I take no Notice of that of the *Arteries*) and no *Contraction* in *Muſcles* was ever ſuppoſed by any ſober Man to be performed, but by an Influx of *Spirits* into the Fibres of the *Muſcles* ſo *contracted.* So that now our Queſtion changes thus, How *wounding* by *Cantharides* makes the *Contraction* of our *Heart* weaker?

The *Contraction* of *Muſcles,* and conſequently of the *Heart,* being by the *Spirits* that flow into them, as I have ſaid before; therefore whatſoever weakens the *Contraction* of any *Muſcle* (ſuppoſe the *Heart*) muſt either be ſuch a thing that can hinder the *Separation* of theſe *Spirits,* or intercept them in their Channel of *Conveyance* to that *Muſcle,* after they are ſeparated. The *Spirits* are known, by *anatomical Experiments,* to be ſeparated from the *Blood* in the *Brain:* Now, whatſoever hinders the *Separation* of the *Spirits*

rits from the *Blood*, muſt either hinder that Rarefaction of the *Blood*, that comes by being broken down into ſmall Parts, and makes them *Spirits* in their proper Place, or the *Blood* of that Fineneſs that is neceſſary for it to be perſpired; *h. e.* a Body that affects the *Blood* ſo as not to *ſeparate Spirits*, muſt be of a Nature to make its Parts more *compact* in their *Contact*; to have their *Contact* with a greater *Niſus*, and conſequently to have its Parts leſs *ſeparable*. The next Way is by affecting its *Motion* ſo that it diſcharges great Quantities out of the *Blood*. By theſe Means the Quantity of *Blood* being leſſer, it gives fewer *Spirits*, when it is broke down; and is not ſo capable to be ſo comminuted, becauſe of the Parts of *Blood* not preſſing ſo much one upon the other, in the whole Courſe and Time of *Circulation*. Or, Thirdly, by ſome Means that affect the Parts that tranſmit theſe *Spirits*; ſo that now no *Spirits* can be *ſeparated*, or in a ſmaller Quantity.

If we apply the *Wounding* by *Cantharides*, or its *Effects*, to all theſe Ways, we ſhall find, that in the *firſt* Conſideration, the *Lympha* ſeparated in a *Bliſter* is nothing at all concerned, and that the ſtupendous Effect might poſſibly be produced without any ſuch Diſcharge. But if you go further, and ſuppoſe the *Cantharides* got into the Maſs of the *Blood*, without any Gathering of *Waters*, you cannot ſuppoſe that the Parts of *Cantharides* that are ſo ſubtle, ſo *alkaline*, and which, by other Experiments, make the *Blood* ſo *fluid*, can be any great Enemies to the *Rarefaction* of the *Blood*, which makes *Spirits*, and fits them to be *ſeparated*; or any conſiderable Inſtrument in leſſening the *Rarefaction*, which is requiſite and abſolutely neceſſary, by the *firſt* Condition. Neither are they, in their Nature, fit Inſtruments for the 3d: Beſides that, we find no Signs and no Marks of ſuch an Interruption, either in the *Brain* or any where elſe. The 2d Condition for hindering ſo great a *Preparation*, and ſo great a *Separation* of *Spirits*, is the Effect of all *Evacuations*. So that, by the by, *Evacuation* is the great Indication for the Cure of a *Fever*, and is a great deal more evident than any *ſuppoſed Poiſon*, or *Malignity ſuppoſed* to be diſcharged, by *ſuppoſed Alexipharmicks*, that are *ſuppoſed Antidotes:* Yet this Effect by an *Evacuation* is granted, and by the Way of working will be found unable to diſcuſs all the *Phænomena*, in doing it in ſo *ſhort* a Time as in the State of our Propoſition.

Let us therefore enquire if a *Bliſter* that makes ſmall *Wounds*, and *cures* a *Fever* in a *ſhort* Time, can produce this its Effect in the only Way we have left us; and that is by *wounding* that *Channel* that carries thoſe *Spirits* that *contract* the *Heart*, give us a quick *Pulſe*, and a *Fever*, with all its Attendants, *Deliriums*, &c. If this Suppoſition is allowed of, no doubt but that any the leaſt Quantity of *animal Spirits* let out by ſuch *Wounds*, in a very little Time, will proportionably weaken the *Heart's Contraction*, and give us a *ſlower Pulſe*, which is all we want; and which is more, this *ſlower Contraction*, which is known by our *ſlower Pulſe*, determining the whole *circulating* Blood with leſs Force, the Parts of *Blood* do not *comminute* themſelves ſo much as when the Motion was more rapid; and, by Conſequence, there is not ſuch a Diſpoſition for *ſeparating* ſmall Parts in the *Brain*, that afterwards they may be derived through the *Nerves* into the *Heart.* But moreover, the leſſer Motion continuing for ſome little Time, or 2 or 3 *Minutes*, in a Velocity ſomething like our natural Motion, all the *Secretions*, which are performed in ſuch *Degrees* of *Velocity*, will again begin to be done as before. If therefore we can put little *Emiſſaries* on the *Nerve* that is more eſpecially concerned in the *Heart's Contraction*, we ſhall hinder any *Preparation* in the *Blood* for *ſeparating* ſo great a Number of *Spirits*; which is one great Requiſite: Nay, we ſhall make *Secretions* of that Sort, and in that Way, as in Time of *Health*; and if there be but *Secretions*, the *contriting* Parts, and thoſe to be broke down, ſhall have no ſuch cloſe *Contact*; and therefore that extraordinary Quantity of *Spirits* ſhall not be *prepared* in the *Blood*; and if they are not *prepared*, they cannot be *ſeparated* from it; or a *moderate Quantity* of *animal Spirits* ſhall be conveyed into the *muſcular Fibres* of the *Heart*: Or, again, which is the ſame thing, its *Contraction* ſhall be *natural*; and all this may be done, or begin to be done, in two or three *Minutes.*

But how we ſhall apply a *Bliſter*, that may *wound* the *conveying Nerves*, is the only Queſtion that remains. To do this we muſt remember, that the 8th *Pair* of *Nerves*, which ſerves for the *Heart's Contraction*, has its Riſe from the Sides of the *Medulla Oblongata* behind the *Proceſſus Annularis*, by ſeveral Threads which join together, and go out by the ſame Hole that the *Sinus Laterales* diſcharge themſelves into the *Jugulars*: And ſince the Union by the *Atlas* is not ſo firm and compact as in the other *Vertebræ*, it is evident, that there is no extraordinary Hindrance, why ſome of theſe *wounding* Parts may not come at that *Nerve.* But if you reflect again, that this *Nerve*, or conſiderable *Branches* of it, run ſuperficially enough on the *Neck*, you will have leſs Difficulty to apprehend how ſome of them are *wounded*, and to underſtand how theſe miraculous *Effects* do happen, and are produced: Or, it is eaſy to underſtand how the ſmall Parts of *Cantharides* can wound the 8th *Pair*, or, by *wounding* its *Branches*, derive from the *Nerve* itſelf, and *leſſen* the *Motion* of its *Liquor.* Or, it is not hard to apprehend how *wounding* by *Cantharides* hinders the Diſpoſition of *ſeparating Spirits*, and *intercepts* them in their Way to the *Heart*; how they make its *weaker Contraction*, and a *ſlower Pulſe.* Or again, it is evident, how the ſmall *Emiſſaries* made in this Way can *cure* a *Fever*, and a *Delirium*, in a *ſhorter* Time than is ſuppoſed in the *Propoſition.*

From this Diſcourſe we may deduce theſe *Corollaries.* 1. That the *Operation* of a *Bliſter* is great and ſudden; That the *wounding* of this *Nerve*, or a *Branch*, is ſo abſolutely neceſſary for *curing* a *Delirium* and a *Fever*, that whatſoever *Miſchief* the applying of vaſt Numbers of *Bliſters* over all the Body may do, yet the *main End* is neglected, if you forget a large one *high* on the *Nape* of the *Neck.* That if there is no *Veſication* after the laying on a ſtrong *Plaiſter*, it neceſſarily eſtabliſhes a new and prodigious *Hardneſs* in the *Skin* and *Veſſels*, and a *Thickning* of the *Blood* for a further *total Stop.*

Obſervations on epidemical *Diſtempers*; *by Dr.* Tho. Molyeux. *n.*209.*p.*105.

XXXI. About the Beginning of *November* 1693, after a conſtant Courſe of moderately *warm* Weather for the Seaſon, upon ſome *Snow* falling in the Mountains and Country about the Town, of a ſudden it grew extreamly *cold*, and ſoon after ſucceeded ſome few Days of a very *hard Froſt*; whereupon *Rheums* of all Kinds, ſuch as violent *Coughs* that chiefly affected in the Night, great *Defluxion* of thin *Rheum* at the Noſe and Eyes, immoderate Diſcharge of the *Saliva* by ſpitting, *Hoarſeneſs* in the Voice, Sore Throats, with ſome Trouble in Swallowing, Wheaſings, Stuffings, and Soreneſs in the Breaſt, a dull Heavineſs and Stoppage in the Head, with ſuch like Diſorders, the uſual Effects of *Cold*, ſeized great Numbers of all Sorts of People in *Dublin*.

Some were more violently affected, ſo as to be confined a while to their Beds; thoſe complained of *feveriſh* Symptoms, as Shiverings and Chilneſs all over them that made ſeveral Returns, Pains in many Parts of their Body; ſevere Head-aches, chiefly about their Fore-heads, ſo as that any Noiſe was very troubleſome; great Weakneſs in their Eyes, that the leaſt Light was offenſive; a perfect Decay of all Appetite; foul turbid Urine, with a Brick-coloured Sediment at the Bottom; great Uneaſineſs and toſſing in their Beds all Night: Yet theſe Diſorders, though they much frightned both the Sick and their Friends, uſually without Help of Remedy, would abate of themſelves, and terminate in univerſal *Sweats*, that conſtantly relieved. This more violent Degree of the *Cold* was more apt, I found, to fall on ſuch as were given to Exceſs in either eating or drinking, or inclinable to a *ſcrophulous* Diſpoſition of Body, than on thoſe that were more temperate, and leſs ſubject to Obſtructions.

When the *Cold* was but moderate, it uſually was over in 8 or 10 *Days*: But with thoſe in whom it roſe to a greater Height, it continued a *Fortnight*, 3 *Weeks*, and ſometimes above a *Month*; one way or other it univerſally affected all Kinds of Men; thoſe in the Country, as well as City; thoſe that were much abroad in the open Air, and thoſe that ſtayed much within Doors, or even kept cloſe in their Chambers; thoſe that were robuſt and hardy, as well as thoſe who were weakly and tender; Men, Women, and Children of all Ranks and Conditions, the youngeſt and the oldeſt; though I think if it were favourable to any Sort, it moſt ſpared thoſe that were aged, among whom I knew ſeveral that were not the leaſt troubled with it, yet it ſeized ſo univerſally, that not one in 30, perhaps I might ſafely ſay more, eſcaped it.

As it firſt appeared towards the Beginning of *November*, ſo it ſeemed to arrive to its *greateſt Degree* of *Violence*, and ſpread moſt *univerſally* about the Middle of it; and by the Beginning of the *Month* following it very ſenſibly *abated*; ſo that very few then complained of their *Colds*. So that in the Space of 4 or 5 Weeks it had its *Riſe*, *Growth*, and *Decay*; and though from firſt to laſt it ſeized ſuch incredible Numbers of all Sorts of Men, I cannot learn that any one truely *died* of it, unleſs ſuch whoſe

Strength was before ſpent by ſome tedious Fit of Sickneſs, or laboured under ſome heavier Diſeaſe complicated with it.

I find that about *November* and *December*, 1691, by ſome ſhort Notes I took then, *Coughs* were more than ordinarily frequent here in *Dublin*, though nothing comparable to what they were lately: They chiefly then affected young Children, whoſe *Coughs* uſually turned to a violent *Chin-Cough*, yet at this Time, among all the Variety of *coughing* Children, I have not met with more than one that was troubled with a *Chin-Cough*, and that too was but in a ſlight Manner: Which minute Differences in the Way of *Epidemick* Diſtempers operating in our Bodies, clearly ſhew, that their *Cauſes* cannot be aſcribed only to the ſenſible *Alterations* of the *Weather*, or the manifeſt Qualities of *Heat*, *Cold*, *Moiſture* or *Drineſs*, highly predominant in the Air, according to the vulgar Solution of them; but they proceed from ſomething more nice and latent than all this.

But to return to our *General Cold*: It was further remarkable for its *vaſt Extent*. It ſeized them at *London*, *Oxford*, and all other Places of *England*, as *univerſally*, and with the ſame *Symptoms* as it ſeized us in *Dublin*; but with this obſervable Difference, that it appeared 3 or 4 *Weeks* ſooner in *London* than in *Dublin*. It alſo reached the *Continent*, and infeſted the Northern Parts of *France*, as about *Paris*, *Flanders*, *Holland*, and the reſt of the *United Provinces* with more *Violence*, and no leſs frequency, than it did in theſe Countries; ſo that I believe no *Epidemick* Diſtemper was ever obſerved to *extend* ſo far.

No Example of any *Epidemick* Diſtemper ſeems in all Reſpects to come nearer in Competition with our late general *Cold*, than the *Tranſient Fever* in 1688. This ſhort Sort of *Fever* was firſt obſerved in *Dublin* about the Beginning of *July*; and it ſo *univerſally* ſeized all Sorts of Men whatever, that I then made an Eſtimate not above one in fifteen eſcaped. It began, as generally *Fevers* do, with a Chilneſs and Shivering all over, like that of an Ague, but not ſo violent, which ſoon broke out into a dry *burning Heat*, with great *Uneaſineſs*, which commonly confined them to their Beds, where they paſſed the enſuing Night very *reſtleſs*: They complained likewiſe of *Giddineſs*, and a *dull Pain* in their *Heads*, chiefly about their Eyes, with unſettled *Pains* in their *Limbs*, and about the Small of their Back, a Soreneſs all over their Fleſh, a Loſs of *Appetite*, with a *Nauſea* or Aptneſs to vomit, an unuſual *ill Taſte* in their Mouth, yet little or no *Thirſt*: And though theſe *Symptoms* were very violent for a Time, yet they did not continue long: For about the 2d *Day* of the Diſtemper, the Patient uſually of himſelf fell into a *Sweat* (unleſs it was prevented by letting *Blood*, which, however beneficial in other *Fevers*, I found manifeſtly retarded the Progreſs of this) and if the *Sweat* was encouraged for 5 or 6 *Hours*, by laying on more Cloaths, or taking ſome *Sudorifick* Medicine, moſt of the Diſorders before-mentioned would entirely diſappear, or at leaſt very much abate. The *Giddineſs* of their Head, and Want of *Appetite* would often continue ſome Days afterwards, but with the Uſe of open freſh Air they certainly, in 4 or 5 *Days* at fartheſt, recovered theſe likewiſe, and were perfectly well. This tranſient Diſeaſe was ſo favourable, that not one in a thouſand died of it: And by the Middle of *Auguſt* it wholly diſappeared; ſo that it had run its full Courſe through all Sorts of People in 7 *Weeks* Time. It alſo *ſpread* itſelf all over *England*, and raged as *generally* in *London* as in *Dublin*, and with the ſame Concourſe of *Symptoms*. But it *began* to be taken Notice of at *London* about the Middle of *May*, and it *continued* there till the latter End of *June*; ſo that it did not ſhew itſelf *here* till it had wholly diſappeared *there*. And it was very remarkable that in *England*, as well as *here*, a ſhort Time before this *General Fever*, a ſlight Diſeaſe, but very *univerſal*, ſeized the *Horſes* too, and ſhewed itſelf by a great *Defluxion* of *Rheum* from their Noſes; which ſhews the *Cauſe* of *ſpreading Diſtempers* to be ſo prevalent, that it works not only on the finer and more delicate Compoſition of *Human Bodies*, but affects even the more ſtrong and groſs Frame of the moſt *robuſt* Animal Productions in Nature.

From theſe *Hiſtories* one may probably gather, That ſpreading *Epidemick Diſtempers* take their Progreſs from *Eaſt* to *Weſt*. But this ſhould be further confirmed by more frequent Obſervations, before one may ſafely determine any thing in this Matter. However this is certain, that the *Plague* and *Peſtilential Fevers* rage more frequently in the *Eaſt*, towards *Conſtantinople* and the *Levant*, than in theſe more *weſtern* Parts of *Europe*; as if that ſeemed a more natural *Clime* for their *Riſe* and *Propagation*.

Exotick *Diſeaſes propagated by Trade and* Infection; *by Dr.* Liſter. *n.* 165. *p.* 793. *Plague. Small-pox.*

XXXII. 1. The *Plague* is properly a *Diſeaſe* of *Aſia*, where it is Epidemical, and is never *bred* amongſt us, but comes to us by *Trade* and *Infection*.

2. The *Small-pox* alſo is an *Exotick Diſeaſe* of the *Oriental People*, and not known to *Europe*, or even *Aſia Minor*, or *Africa* at all, till a *Spice-Trade* was opened by the latter Princes of *Egypt* to the remoteſt Parts of the *Eaſt-Indies*, whence it *originally* came, and where it rages more cruelly at this Day than with us.

The like I think of the *Griping of the Guts*, that it is a peculiar *Diſeaſe* of the *Weſt-Indies*, and yearly received from thence, for this Reaſon, that it is none of the *Tormina Ventris* of the Antients; and therefore called by a new Name, by ſuch as have writ of it; and alſo for that it is yet ſcarce known in any Part of the *North* of *England*, or *Mid-land Counties* thereof.

An Experiment concerning the Plague; *by Dr.* Jo. Bapt. Alprunus. *Ph. Col. n.* 2. *p.* 17.

XXXIII. No *Poiſon* is greater than that of the *Sickneſs*; our outward Senſes are not affected by it, and our Underſtanding does not comprehend it; it is *Aërial* and *Volatile*, and it is *fixed* and *coagulated* when it concretes into *Buboes*. Hence I conceived that the Way for me to penetrate into the moſt latent Quality of this *Peſtiferous Venom* was by *Chymiſtry*; not with Knives, but *Glaſſes*; not with Iron, but *Fire*. This horrid Undertaking (for the Glory of God, for the Favour of my Prince, and the Good of my Neighbours) I ſet upon without Dread. Having lanced a *peſtilential Boil* of M. *Godfrey Reſhel*, I collected the *virulent* Matter, and putting it in a *Retort*, and luting a *Receiver* to it very cloſe, I applied Degrees of *Fire*; at firſt came over a

Water, then a more *fat* and *oily* Matter, and at laſt a *Salt* aſcended into the Neck of the *Retort*. The *Fire* being removed, and the Glaſſes ſeparated, there came forth ſo great a *Stench*, that a thouſand Wounds expoſed to the Summer-Heat could not have paralleled it. And though I thought I had ſufficiently armed my Senſes againſt it, that is, my Ears with Cotton, my Noſe with Peſſaries, my Mouth with Sponges, all dipt in Vinegars and Treacles, yet, as if touched with a Thunderbolt, I was ſtruck with a *violent Trembling* of my Body. To make ſhort, having broken the *Glaſs*, I gave ſome of this *horribly ſtinking Salt* to M. *Reſhel* to *taſte*, and then taſted it myſelf, and it was found to have an *Acrimony* as great as *Aqua Regis*.

Hence no Wonder, that ſo many are afflicted with continual *Vomiting*, ſo that they can keep neither Meat nor Drink, ſince their Stomach is continually irritated to this Expulſion by a *poiſonous* Quality ſo *ſharp*.

Hence no Wonder, if from the *Sharpneſs* of this *Venom* agitating the Humours, and urging the expulſive Faculty to a continual Perturbation of the Belly, a *Diarrhœa* is often cauſed, which follows the *Patient* to Death.

Hence no Wonder, that from this *ſharp* Matter, ſuch piercing *Pains* are felt in *Buboes*, and ſuch *Burnings* in *Carbuncles*.

Hence no Wonder, why the beſt Remedies (and as it were the Anchors of Safety) are *Sudorificks*, allaying the *Acrimony*, and driving it out through the Pores; for I found thoſe always which *ſweat*, were in a hopeful Way of Recovery; but thoſe which did not, were almoſt all taken off. I therefore ordered *Sudorificks* to be repeated every 8 *Hours*, and ſtrengthning *Cordials* every *Hour*.

My uſual *Sudorificks* for the better Sort were, *Species Diamoſci*, *Diambræ*, *Liberantes Pannonicæ Rubræ*, *Extractum contrayervæ*, *Lapis Bezoar*, *Unicornu Marinum* (my *Specifick Powder*) *Sal C. C. volat. Succinum volat. conchæ Perlar. Volatil. Aqu. cord. temp. cum Moſcho Scorzon. Cardui Bened. Syr. Scordii*, *Corallor.*

For the meaner Sort, *Species Cor. temperat. Electuar. de Ovo*, *Antimon. Diaphoret. Bezoarticum minerale Joviale cum Aquis ſupradict.* & *Syrup.*

My Cordials for the richer Sort were, *Confect. Alcherm. de Hyacinth. magiſt. Ferla. Hyacinth. Granator. cum Aquis è toto Citro*, *Saxon. Salæ*, &c.

For the meaner Sort, *Coralia rubra contuſa*, *Confect. Alcherm. incomplet. cum Aquis tormentil. Cardui bened.* &c.

Theſe were in general the Medicines uſed in this Diſtemper, but with Variety, according as the Age, Temperature, and Condition of the Patient required.

A Preſervative *againſt this* Contagion.

But becauſe no *Alexipharmack* is ſufficient in this *Contagion*, therefore, grounding my Judgment upon the Principles of *Harvey* about the *Motion* of the *Heart*, and the *Circulation* of the *Blood*, and ſome other of *Bartholine* and others, I concluded, this *Peſtiferous Venom*, attracted by the Breath or Pores, by the *Circulation* of the *Blood*, to be carried to the *Axillary* and *Inguinal Glandules*, &c. where, if it long ſtagnates, it concretes in *Buboes*, which tend to *Maturation*; but if it opens itſelf a Way, and paſſes with a natural *Motion* of the *Blood*, and ſo is carried to the *Heart*, then *Death* enſues.

Therefore not only for myſelf, but for two other Friends, I made *Inciſion* with a Lancet *in Inguine dextro & ſiniſtro*, and put in a *Seton*, to the End, that by this artificial Way the *Venom* might find a Paſſage. This I often tried with good Succeſs, great Quantity of Matter always voiding that Way, but more notably when I was any Way touched with *Peſtilential* Strokes, or Alterations. By the Help of which, I kept myſelf in good Health during the *Contagion* which raged here at *Prague* in 1680.

An Univerſal Preſervative *againſt* Infection; *by Dr.* Jaco. Joh. Wenceſlaus Dobrzenſky *de Nigro Ponte.* Ph. Col. *n*, 2. *p.* 20.

XXXIV. Whoſoever converſes with Patients affected with any *Diſeaſe* whatever, if he would preſerve himſelf from *Infection*, muſt be ſure, ſo long as he abides within the Sphere of the *Steams*, never to ſwallow his *Spittle*, but to ſpit it out. For this Author conceives that to be the Part which firſt and moſt eaſily imbibes the *Infection*, and by that, ſwallowed, the *Infection* is carried, as by a proper Vehicle, into the *Stomach*, where it works thoſe diſmal and fatal Effects.

This Sentence of his he grounds both upon his own Experience, long tried for his own *Preſervation*, and on divers Reaſons ſet down by way of Aphoriſms from this *Hypotheſis*; viz.

That moſt *Diſeaſes*, eſpecially *Peſtilential Fevers*, are *infectious*; that this proceeds from a *ſeminal Ferment*, which is emitted by the Patient by way of *Steams* into the encompaſſing Air, and ſo *infects* all things within a certain Sphere or Diſtance: This drawn into the *Mouth* by the *Breath* is apt to *infect* the *Saliva* or Spittle, which, being *ſwallowed*, *infects* the *Stomach*, and ſo the reſt of the Body; but being *ſpit* out, frees the Body from *Infection*. And therefore he conceives that ſtrong *ſmelling* and ſtrong *taſting* Subſtances kept in the Mouth, and chewed to promote *Spitting*, are of very good and neceſſary Uſe for *Phyſicians*, *Chirurgions* and *Apothecaries*, &c. that are neceſſitated to viſit *infected* Perſons.

An Hydrophoby; *by Dr.* Mart. Liſter. *n.* 147. *p.* 162.

XXXV. *James Corton* (of *York*) a very ſtrong and well built young Man, was bit with a *mad Dog* in the Right Hand; the Wound healed of itſelf, and the Thing was forgot. After about 5 or 6 Weeks, he complains of *Pain* all over his *Bones*, but eſpecially his *Back* and round about his *Stomach*, looks very *pale*, *hollow-ey'd*, &c. The 3d Day after this Complaint, *viz.* *Sunday Mar.* 11, $168\frac{2}{3}$, he called for burnt Brandy, drank it, went to Bed and vomited it up: After this he had a *reſtleſs Night*, and in the Morning found himſelf very ill, with a ſtrong *Riſing* in his *Stomach*, and though no *Thirſt*, yet an Impotence to *Drink*, and even to ſwallow his *Spittle*, which was Death to him, as he often ſaid. *Diaſcordium* and a Bottle of *Cordial-Water* was brought to him by an Apothecary that Morning: The *Diaſcordium* he took, but was not able to *drink* of the *Cordial* one Spoonful. Thus on *Monday* Morning; about one o'Clock that Day, I firſt ſaw him, and found him upon his Bed, his *Pulſe* very *ſlow*, and ſometimes *unequal*, but not unleſs frighted from the *Riſing* of his *Stomach*; his *Fleſh cold*, his *Tongue* not dry, but flexible and *moiſt*, a little *white*. I cauſed him to riſe off the Bed, and ſet him full in the Light; and then, becauſe he mightily complained of I know not what Sickneſs about his *Stomach*, I offered him of the *Cordial*, but he *ſtarted* and *trembled* at the Approach of it. This I exceedingly admired; wherefore I called for a Glaſs of *Wine* or *Water*, and a Tumbler of *Water* was brought me up, which I gave him to *drink*, but he vehemently *ſtarted* at it, and his *Stomach* ſwelled and *roſe* after I know not what odd and ſtrange Manner; and I could then find his *Pulſe* very *trembling* and diſturbed. I ſtill urged him to drink, but as I put it forwards to his Mouth, he the more *affrighted* drew back his Head, and *ſighed*, and eyed it with a moſt ghaſtly Look, not without *Screeking* and Noiſe: This ſoon convinced me that it was *Aquæ Pavor.* I forthwith ordered a *Vein* to be opened in the Arm which was *bit*, cauſed the *Wound* to be *ſcarified* and drawn with *Veſicatories*, and the ſame Plaiſter to be applied to the Neck and Legs and the Inſide of the Arms: I ordered the uſual and famed *Antidotes* to be given him, as of *Theriaca*, *Cinis Cancrorum*, *Ruta*, *Agaricus*, &c. in *Bolus's:* For it is to be noted, that ſolid Things in a Spoon he could take, but yet not without much *Trembling* and *Fear*, and *Caution*, and an earneſt Requeſt that no Body would ſuddenly offer them to him, but give them into his Hand gently; and then he would, by Degrees, ſteal his Hand ſoftly towards his Mouth, and of a ſudden chop the Spoon in and ſwallow what was in it, *velut Canis ad Offam*; and this he did more *greedily* and readily than any other Man could do. Of theſe *Antidotes* in *Bolus* he took a *Dram* every *Hour*, and always in this Manner, for at leaſt a Dozen Times taking; and likewiſe *Drink* was proffered him in the Night, but he could not ſee it without *Horror*, and the ſame Motions from his *Stomach*. Nay, he did affirm, that as often as he by Chance ſwallowed any *Spittle*, it went to his Heart, even as though he ſhould die that very Moment. This Night paſſed wholly without any *Sleep* or Reſt.

Tueſday Morning I viewed his Blood, which was, both as to the *Serum* and *Cake*, well coloured, and in ſuch Proportion as is uſual in healthful Perſons, and of good *Conſiſtence.* He had now a *violent Fever* upon him, and a very *quick Pulſe*. *Water* was offered him by my Order, but in vain, he begging he might die unmoleſted; nothing being ſuch a *Terror* to him as the approach of any *Drink*. I then, with much Difficulty, perſwaded him to caſt himſelf croſs the Bed upon his Belly (for he had his Cloaths looſely about him) hanging his *Head* over the other Side; perſwading myſelf that this Poſture might be advantageous to his *drinking*, ſince that in the erect Poſture of a Man he could not ſo much as endure the Approach of Liquor. In this Poſture then of a *Dog*, he ſuffered a large Bowl filled with *Small-beer*, to be brought under his Head, and imbracing it with Raptures of Joy, he declared he was infinitely refreſhed with the Smell of it; that he now ſaw it with Delight, and aſſured us he ſhould be able ſoon to *drink* it all off. And he that now thought himſelf a dying Man talked pleaſantly, and ſaid many paſſionate Things to his Brother, Wife, *&c.* wonderfully extolling this Invention, and thanking me for it. He endeavoured with great Earneſtneſs to put down his Head to it, but could not; his *Stomach roſe* as often as he opened his Lips: At length he put out his Tongue, and made towards it as though he would *lap*; but ever as his *Tongue* never ſo little touched the

Surface of the *Beer*, he ſtarted back *affrighted*; and yet all this while was pleaſed with the Thoughts of *drinking*, and would not ſuffer the Maid Servant to take it away from under his Head; and if ſhe did a little withdraw it, he ſaid he followed it, by the Smell with Delight, ſnuffing with his Noſtrils. After a long Time being mightily foiled, he alledged that the faint Smell of the *Small-beer* hindered him from *drinking*, and therefore deſired a Bowl of *Ale*, which was brought him: But after much ſtriving, and exerting his *Tongue* a thouſand times, he could not *drink* of it; and *lapping* with great *Affrights*, as often as his *Tongue* touched it, he ſtarted back with his Head, bringing it down again gently to the Bowl a hundred Times, but all in vain. And in this Poſture, what upon his Belly, and what upon his Hands and Knees, he kept himſelf at leaſt an *Hour* thus tantalizing himſelf; but it was not in his Power to *drink*. We then gave him a Quill, which conſiſted of 2 or 3 Joints, the one End in his Mouth, the other in the Liquor; but he could not manage it, nor *ſuck*, no more than a *Dog*. I perſwaded him to give over, and lie down, which he did; and not long after my going away he fell into a *Convulſion Fit*, *bit* and *ſnarled*, and *catched* at every Body, and *foamed* at the Mouth. After this *Fit* was over, he took an *Elleboriſm* in a *Bolus*, which was taken like the reſt, and very willingly by him: It wrought about 3 or 4 Times very plentifully, and he declared himſelf wonderfully at Eaſe by it; but yet now and then fell *convulſed*, and then always inſenſible. And after 4 *Hours* I returned to him again, and found the Miniſter with him; he talked very ſenſibly to him, and prayed very earneſtly with him, ſaying the Prayers after him, and deſired the *Sacrament*, which in theſe Circumſtances could not be given.

He was again ſollicited to *drink*, and he now readily enough put himſelf into the former Poſture, and with as much Earneſtneſs as ever uſed all the little Shifts to *drink*, while the Bowl was under his Head; but all in vain. He had a little Silver Tumbler filled with *Drink* put into his Hand; which ſuddenly, when he had as it were ſtolen it near his Mouth, he would have thrown it into his Throat, as he did the *Bolus's*; but it hit againſt his Teeth and fell into the Bowl. I cannot ſay he ever went to *ſtool* or made *Water* all this Time, and therefore had a *Clyſter* given him; but upon parting with it, which he did immediately almoſt as ſoon as given, he *died convulſed*: But his not *making Water*, as well as a troubleſome *Priapiſme* which he complained of when upon his Knees, might proceed from the *bliſtering Plaiſters*, as well as from his *Diſeaſe*.

That nothing may be omitted which relates to this Caſe; The Day after his *Interment* I accidentally met with his Couſin Mrs. *S.* who told me that her Daughter was in Fear, for juſt that very Day *Fortnight* before his Death ſhe had been at his Houſe, and he would go Home with her to her Mother's; that ſhe remembred his Hand *trembled* and his Body *ſhaked*, that he was in a *cold Sweat*, and in a great Diſorder, ſo that ſhe aſked him what he ailed? He told her, that after his Work (for he was an Upholſterer) it had been of late uſual with him: And which was remarkable, the very *Dog* which *bit* him, came at that Time along with him, to her Mother's Houſe, and was alive and well at the Man's Death.

To this we may add, that Mr. *Widdow*, a Mercer, doth affirm, that about the very Time that Mr. *Corton* was thought to be *bit* with Mr. *Sutton's Dog*, a black Dog, which he verily believes to be the ſame, came and *bit* a *Whelp* of his in his Shop. The next Day the *Whelp* ran *mad* up and down the Houſe, and *bit* both him and the Maid in the Leg, and died that very Day. About a Month after he was *bit*, he found himſelf not well, and was troubled with a *Pain* at his *Heart*, and had a *Fearfulneſs* and *Trembling* upon him, and got no Reſt for 3 *Nights*; upon which he had himſelf *blooded*, and found himſelf better: His *Maid* doth not yet complain of any *Harm*.

It is very hard to give any probable Reaſon of this *Aquæ Pavor*: What *Galen* (*de Theriaca*) ſays of their much coveting *Water*, becauſe of the intolerable *Thirſt* upon them, agrees not with our Caſe: For this Man would often ſay, that he was not *thirſty*, which alſo appeared by the *Moiſture* and *Flexibility* of his *Tongue*. Nor was he *diſtracted*, as *Galen* would have them, but all the Time in his Wits, and diſcourſed rationally. What *Julius Palmarius* means by the 3d *Paroxyſm* of an *Hydrophobia*, I cannot underſtand: For this Man had the Diſeaſe upon him continually from the firſt Moment to his *Death*, which was near 48 *Hours*, without any *Intermiſſion*. *Dioſcorides* treats of it moſt ſoberly, and is to be credited; *Quidam, qui jam* Aquæ metum *ſentirent*, *ſumpto* Helleboro, *ſimulac primum Morbi impetum experirentur*, *ſanati ſunt*: *Nam & jam* vitio tentatos *nemo unquam ſervare poteſt*. This very well agrees with our Caſe; the *latter Perſon*, who had a Senſe of the *Evil*, had it prevented by *bleeding*; but our *Man*, who had the *Evil*, that is, the *Aquæ Pavor* upon him, not *bleeding*, or the moſt famed *Antidotes*, or even *Hellebore*, could in the leaſt ſave, though not very untimely given him.

De Morbis Contagioſis.

The Caſe indeed ſo rarely occurs, that it cannot be obſerved in all due Circumſtances, in order to its clearer Underſtanding, and conſequently *Cure*; we ſhall venture however, to lay down ſome few Things to *ſolve* it by.

Firſt, That *J. Corton* had ſome of the *organick Parts* of his Body tranſformed into, or affected after the Nature of a *Dog*, eſpecially the *Gula*, *Tongue*, &c. ſo that what was offered to him in the *erect* Poſture of a *Man* was very *frightful*, as well as difficult for him to take, becauſe againſt his new Nature, as much as it would be for us to get a *Dog* to *drink* ſtanding upon his hinder Legs. But yet this is not all, for when he was turned upon his Belly, and would have acted the *Dog*, he yet could not *drink*; and though he frequently put out his *Tongue* and *lapped*, yet he could not endure to take any thing into his Mouth of Liquor, as though ſomething had hindered him within. Therefore we may imagine he was alſo *convulſed* in thoſe Parts, or ſwelled; but this we cannot grant, for the contrary does plainly appear, becauſe he could caſt any thing into his Mouth and ſwallow it; as he did very many times ſtiff *Bolus's*, more nimbly as to the Swallow, than any Man reaſonably could be ſuppoſed to do, that was ſo weakened.

Secondly, That his *Spittle* was *envenomed*; for as oft as he ſwallowed it (his *Stomach* vehemently abhorring it) it went to his Heart (as we ſay) and was even preſent Death to him. And ſo liquid Things coming nearer to the Conſiſtence of *Spittle*, might the rather *movere Salivam*, and therefore give him a greater *Terror* and Difficulty to ſwallow, than *ſolid* Things. And that his *Spittle* chiefly was *infected* with the *Venom* of the *Dog*, ſeems probable from theſe Reaſons alſo. 1. Becauſe the *Dog* bit him, whoſe *Spittle* alone to be *venomous* to the Touch, there are many credible Inſtances in *medical Hiſtory*. 2. He was almoſt like a *Dog* in the Mouth, *viz.* where are the proper Organs of the *Saliva*. 3. The *Bite* of a *Man ſo bitten* is alike *infectious*; but otherwiſe *innocent*.

Gal. *de Locis Affec.* lib. VI.

But it may be aſked, how comes it to *infect* his *Spittle*, and not other *Humours*, and the *Blood*. I anſwer; the *Blood* in Part was undoubtedly affected, as the *Symptoms* ariſing before the *Aquæ Pavor* (which yet is the only true *Pathognomick* of the *Diſeaſe*) demonſtrate. Again, the *Blood* is not one *Liquor* (as is generally thought) but many diſtinct *Liquors* circulated together in one Set of common Veſſels; and ſo it might *infect* that Liquor, which it was moſt a-kin to, as the *Saliva* of a *Dog*, to the *Saliva* of a *Man*.

An Hydrophoby; *by Dr.* Roger Howman. *n.*169. *p.*916.

XXXVI. On *Wedneſday* at Evening, *Oct.* 1. 1684, I was called to a Patient at *Norwich*, who about 6 *Weeks* before had been *bitten* with a *Mad Fox* on the Right-hand: He began to be indiſpoſed the *Saturday* before with *running Pains*, yet ſo well as to be abroad next Day at Church. On *Monday* his *Pains* grew more troubleſome, and the *Day following*, much worſe, eſpecially on his Right-hand, Arm, Shoulder and Back, but not to Confinement: On *Wedneſday* (I know not by whoſe Advice) he took a Doſe of the common *purging Spirit* of *Scurvy-graſs*, which gave him 7 or 8 Stools, and made him very faint, and weak; ſo I found him; and complaining that he could not uſe his Right Hand (it beginning to be *paralytical*) though his *Pains* very much abated there, and where elſe they had been moſt troubleſome, excepting only on the lower Parts, or Small of his Back, where they ſoon after vaniſhed alſo. He told me he bled freely at the *Wounds* the *Fox* had made, and that they *healed* without any farther Trouble, than now and then a little *girding Pain* on that Hand and Arm; and farther ſaid (to pleaſe his Friends) he had taken a white Powder of an Apothecary, and believed himſelf in no Danger of what was feared (for I had diſcovered the Danger I apprehended in his Condition.) Tho' the *Aquæ Pavor* did not yet appear, his Heat was much encreaſed, and his Pulſe *intermitted* every 5th or 6th Stroke, but on the *Right Side only*; which I again and again examined, finding no Variation: He alſo looked ghaſtly and thin, but his Eyes ſparkling and fiery. I preſcribed the beſt temperate *Antiſpaſmodic* and *Antiparalytic* Remedies I knew, to be mixed with the *Specificks* of common uſe in an *Hydrophobia*. Thus much on *Wedneſday* at Night. Next *Morning* he complained his Night had been *reſtleſs*, that then he had wholly loſt the *Uſe* of his Right Hand, and tho' the *Pains* were more abated, yet he was very hot and uneaſy: His *Pulſe* then was much ſtronger than over Night, but *intermitted* on the *Right Side only* as before: His Countenance was ſomewhat more ghaſtly, yet his Veins very full, as *in Initio & Augmento Febris*, and no *Hydrophobia* appearing, I adviſed him to bleed 6 or 7 Ounces at the Left Arm (the Right being *paralytical)* and the Continuance of what I had preſcribed before: He bled 8 Ounces very freely, the *Blood* well coloured, but very thick. After I left him, the great *Symptom* appeared, and in my Abſence, another was conſulted, who gave him many Remedies. At my Return out of the Country on *Friday* at 6 at Night, his *Heat* was very great, and his *Pulſe* very high, and *intermitted* then on *both Wriſts*, and if any thing were offered him to *drink ſtanding* or *ſitting*, he *ſtarted* as if his Head would have fallen backwards off his Shoulders, but when *laid* upon his Pillow, could (though with great *Difficulty* and Uneaſineſs) now and then get down a Spoonful. He looked then very thin and ghaſtly, and ſeemed ſhy, or afraid of every Body that came ſuddenly near him, telling them that they ſtifled him, or ſtopped or hindered his Breath in coming ſo haſtily to him. His *Reaſon* was all along very good, and (as ſome obſerved) better than in his Health: His *Voice* was broken and imperfect, as theirs whoſe Tongue and other Organs of Speech are growing *paralytical.* I ſaw him again at 10 that Night when all *Symptoms* were growing worſe; yet he could then walk out of one Chamber into another, with very little Help, but between 12 and 1 next Morning he *died*, without any *convulſive* Motions, Sighs or Groans; as if in a Moment there had been a total *Paralyſis.*

From this Relation it is moſt obſervable, 1. That as the *Pains* (which were like thoſe in the *Rheumatiſm*) abated, the *Paralyſis* and *Fever* increaſed. 2. As the *Fever* increaſed, the *Intermiſſion* of the *Pulſe* grew more frequent, though the *Pulſe* were much *ſtronger*; but why it *intermitted* firſt on but *one Side*, is not eaſily accounted for. 3. That the Imperfection of *Voice*, as well as the Difficulty of *Swallowing* were the Effects of the *Paralyſis*, may probably be allowed, and be a ſatisfactory Reaſon why the Perſon Dr. *Liſter* mentions, could not uſe the *Quill* which was given him to *ſuck* with. 4. That his thin ghaſtly Aſpect, the Defect of Spirits and tonick Vigour (if I may ſo call it) was from a *paralytical* Original, is not unreaſonable to conjecture. 5. That the *Paralyſis* chiefly affected the *Muſcles* of the *Head* and upper Parts, may be partly collected from his Inability to hold his Head *ſteady* at the Approach of any *Liquor*; the *Fever* thence ariſing, cauſing him to *ſtart*, and his *Head* ſo to fall backwards, as if it would fall off his Shoulders. 6. And that his lower Parts were leſs affected, is probable, becauſe, 2 or 3 *Hours* before he *died*, he could *walk* out of one Chamber into another, even when his *Voice* was hardly intelligible.

A Child bit by a mad Dog; by Mr. J. Turner. n. 207. p. 24.

XXXVII. In the Year 1688, there was brought to us for Cure a Child of about 3 Years of Age, who had juſt then received a large *Wound*, upon the *Maſſeter Muſcle* by the *Bite* of a *Mad-dog*. The Wound we treated with *Digeſtives* for ſome Time, *Sutures* were forborn, though otherwiſe neceſſary, that the *Sanation* thereof being deferred, the contracted *Venom* might have the freer Egreſs thereat. There was in ſhort Time diſcharged a very laudable *Pus*, and the Wound *incarned* as faſt as we could deſire. In about 3 Weeks Time we had *incarned* and brought over a very firm and ſeemly *Cicatrix*; and in about 2 Days after *cicatrizing* the *Wound*, the Child was ſeized with a *Fever*, a diſorderly *Pulſe*, and *Palpitation* of the *Heart*: The Night enſuing he grew *delirious*, and the ſucceeding Day the *Malignity* had made ſo virulent an Impreſſion upon the animal Spirits, as did excite very ſtrong Irritations in the Members of the Body by *convelling* of their muſcular Fibres. Neither was the *Brain* and its Parts freed from the ſame morbid Taint, which manifeſted its Ferocity in a moſt ſtrange and unuſual *Diſtortion* of the *Eyes*, from a confuſed and irregular Expanſion of the *optick Nerve*, attended with an extraordinary *Fierceneſs* in the whole Viſage, continual *Vigiles*, and a conſtant *Trepidation*, with a reiterated *ſnatching* up of the lower *Mandible*, making Signs as if he would have *bit* at any thing that was offered him. His *Voice* was uttered with a *Canine Hoarſneſs*, and had an extraordinary reſemblance to the *Barking* of a *Dog*. He was moreover infeſted from that Time with a *Singultus* and a *Foaming* at the *Mouth*. He was no ſooner ſenſible of the *Reflection* of a *Looking-glaſs*, which out of Curioſity I preſented before him, than he *threw* his *Head backwards* with great Violence, and continued *barking* and *ſnapping* at every thing near him: In the Evening, notwithſtanding ſuch *Alexipharmacks* as had been exhibited, he ſunk under the Oppreſſion of theſe cruel *Symptoms*. I was not permitted to open him; but the *Abdomen*, I perceived, was exceſſively *inflated*, his Limbs *convulſed*, and the Superfice of the Body of a *livid* Colour; the Muſcles of the Face were drawn into ſuch a Form as did nearly repreſent a *ſpaſmus Cynicus*.

Two Boys in Ireland *bit by a* mad Dog; *by Mr.* Kenedy. *n.* 242. *p.* 246. *n.* 243. *p.* 308.

XXXVIII. About the laſt of *October*, 1679, it happened that 2 Boys of 10 and 9 Years old, of a ſanguine and cholerick Complexion, did *touch* and *handle* the Head of a *Dog* which had been *wounded* by a *mad Dog*, but by the *handling* and *waſhing* of his *Wound* by the Children, the *Dog* ſo *wounded* was healed, and did not become *mad*. But about *May* 1680, the Children became *unwell*, and were ſeized with a *paining Grief* towards the *Bottom* of their *Bellies*, which did grind and torment them with *Pain* and Trouble, which aſcended gradually upwards towards their *Navel*: And about the 1*ſt* of *July*, together with the foreſaid *Grief*, they were taken with a ſlow *Flux*, and *fainting Fits* by Times, when the foreſaid Pains aſſaulted them. After they had continued thus for a Time, their *Pain* and *Grief* aſcended towards and above the *Stomach*; whereupon followed very violent and *convulſive-like Motions* in their Bodies, eſpecially about the *Stomach* and *Belly*, by which they were toſſed and tumbled and diſturbed in the whole Body, with ſome *Foaming* at the *Mouth*, in the Interim of their *Fits*: Now and then theſe *Symptoms* continued and increaſed until the latter End of *Auguſt*, that they were taken with the *Fear of Water*, and could not endure to *look* into any *liquid* Thing, until the Cup was covered, but forthwith would have fallen down as *dead*, and ſo would have lain a little Time as in a *ſwooning* or dead *Fit*; and then would have tumbled and toſſed in the foreſaid violent Motions and Diſtractions of their Bodies, *moaning* and *groaning*; and ordinarily, the eldeſt eſpecially, *ſnarled*, *barked*, and endeavoured to *bite* like a *Dog*. They continued in this *Fit* for an *Hour* ſometimes, and ſometimes leſs, and ſo came out of the *convulſive-like Motions*, lying as it had been in a *Swoon*, a little before they came out of the *Fits*, and when they did come out of the *Fits*, would have crept away in a *ſeared* Manner from any who had been by them: And thus within an *Hour*, or little more, they came ſo out of their *Fits*, that they were alſo *well*, and as much themſelves as ever. They remained under theſe *Symptoms* until the Middle of *September*, every Day taking the ſaid *Fits*, in which they could not *ſpeak*, and in their Intermiſſions were as towardly and as well in their Wits as ever: And it was obſervable that they *both* took the *Fits* and came out of them at the ſame Time. But about the Middle of *September*, about which Time eſpecially the *Barking* or *Snarling* like a *Dog* came, they became more *wild*; ſo as for ſome *Days* now and then, even whilſt out of their torturing *Fits*, they would not endure any *Company*, no not ſo much as to come near one the other, and thus continued of this Diſpoſition for a *Week*; and then the Eldeſt drew near his Father, ſaying as one ſurprized, Father, *I am well*; and ſo he and the other became forthwith *well*, and could look into *Water* without any *Fear*, and ſo continued to be *well* for 3 or 4 *Days*, and after that fell *ill* again, and remained *ill* 6 or 7 *Days*; at the End whereof they both became *well* as formerly on a *ſudden*, and from that Time continued *well*; only the Eldeſt, about the End of *January*, had ſome *Fits* like the former.

Obſerve, that in *Auguſt* there were *Doſes* of *Antimony* and *Mercurius Vitæ* preſcribed together with *Antidotes* of *Venice Treacle*, Powder of *Crabs Eyes*, and other Things.

Cures *for* Mad Dogs *or any thing* bit *by them*; *by Sir* Robert Gordon. *n.* 187. *p.* 298.

XXXIX. 1. ℞ *Agrimony* Roots, *Primroſe* Roots, *Dragon* Roots, ſingle *Peony* Roots, the Leaves of *Box*, of each a *Handful*; *the Star of the Earth* (or *Lychnis Viſcoſa flore muſcoſo*, *Caſp. Bauhini*; or *Spaniſh Catch-fly*) two *Handfuls*; the Black of *Crabs Claws* prepared, *Venice Treacle*, of each one *Ounce*: All theſe are to be beaten and bruiſed together, and boiled in about a Gallon of *Milk*, till the Half be boiled away; then put it into a Bottle, unſtrained, and give of it, about 3 or 4 *Spoonfuls* at a Time, to the *Dog* or *Beaſt*, three Mornings together, before *new* and *full Moon*. It will be neceſſary the Day before you adminiſter the *Medicine*, to take away a little *Blood*. Some of theſe Roots and Herbs being difficult to be gotten in the Winter, they may be gathered in their Seaſon, and being dried and well *powdered*, may be given mixed with the *Crabs Claws* and *Venice Treacle*, with *Sallet Oil* or *Butter*, and it will do as well.

For *Men* or *Women* that are *bitten* with *Mad-Dogs*; take the ſame Ingredients in the ſame Quantities, and the *Roots* and *Herbs* being bruiſed all together, with the *Crabs Claws* and *Venice Treacle*; let them be infuſed warm into two Quarts of ſtrong *White Wine*, for at leaſt 12 *Hours*. This being ſtrained, the Party *bitten* is to take about a *Quarter* of a *Pint* Evening and Morning, 3 *Days* before the *new* and *full Moon*; it may be ſweetned, either with *Sugar* or ſome *Cordial Syrup*.

Several Receipts *for the* Bite *of a* Mad Dog; *by Sir* Theod. Mayern. *n.* 191. *p.* 409.

2. 1. Take *Virginia Snake-Root* and Flowers of St. *John*'s *Wort* gathered in their Prime, equal Parts of each; let them be made into a very fine Powder. The *Doſe* is from a *Scruple* to a *Dram*, and to be taken in any Sort of *Decoction* prepared with *Specificks*. To a *Horſe* give two *Drams*, to a *Dog* from 1 to 1 ½ *Dr*. This before the 9th Day after the *Bite*.

2. Take Leaves of *Rue* picked from the Stalks and bruiſed, 6 *Ounces*; of *London Treacle* (or which is better, *Venice Treacle*) *Garlick* pilled and bruiſed, and fine *Filings* of *Tin*, each 4 *Ounces*; put them in 4 ℔ of *Canary*, or good *white Wine*, or in caſe of a nice or hot Conſtitution, into the ſame Quantity of *ſtrong* and well worked *Ale*, in an earthen Veſſel well ſtopped. Then let there be made a *Digeſtion*, or gentle Boiling thereof in *Balneo*, for 4 *Hours*, ſhutting in the *Steam*, then preſs it and ſtrain it. The *Doſe* is from 2 or 3 *Ounces* (and in ſome Perſons more) to be taken every Morning for 9 *Days*. The Party *bitten* muſt faſt for 3 *Hours* after it, and the *Dregs* that remain after Expreſſion muſt be bound upon the *Wound* received, renewing it every 24 *Hours*. N. B. That the 9th *Day* after the *Bite* muſt not be let ſlip, before this *Medicine* be taken, leſt the *Poiſon* ſeize the *Blood* too ſtrongly. It muſt be given cold, or at leaſt only a little aired. A double Quantity may be given to a *Beaſt* ſoon after the *Bite*.

I never found this *Remedy* to fail. *Theo. de Vaux*.

3. Pluck the *Feathers* from the *Breech* of an old *Cock*, and apply it bare to the *Bite*, and do this upon each of the *Wounds*. If the *Dog* were *Mad*, the *Cock* will *ſwell* and *die*, and the Perſon bitten will do well; but if the *Cock dies* not, the *Dog* was not *Mad*. If the *Wounds* be very ſmall, it is requiſite to open them with a Lancet.

4. Let the Party be 9 *times* plunged in the *Sea*, while he is *faſting*, as ſoon as may be after the *Bite*. Let the *bitten* Part be waſhed with a *Lie* of the *Aſhes* of *Oak-wood* and *Urine*, and apply a Cataplaſm of *London Treacle*, *Alliaria*, or *Hedge-Garlick*, *Rue* and *Salt*.

Take dried *Rue* and *Scordium*, each 2 *Dr*. *Virginia Snake Root* 1 ½ *Dr*. Flowers of *St. John*'s *Wort* 3 *Dr*. fine *Filings* of *Tin* and *Garlick* cut ſmall, each 4 *Dr*. *London Treacle* one *Ounce*: Let them be all beaten and exactly mixed together, adding *Syrup* of *Lemon Pills* as much as ſuffices to make it into an *Electuary*; divide this into 9 equal Parts to be taken every Day one, drinking after it a ſmall Draught of good *ſtrong Ale*. Let him walk upon it, and not dine till 4 *Hours* after. Uſe as little of the aforeſaid *Syrup* of *Lemon Pills* as may be; and if that be not at hand, a *Syrup* made of *Malaga Wine*, adding as much *Sugar* as it can diſſolve, may ſerve the Turn.

Make up of this *Electuary* 4 ½ *Ounces* at a Time, that ſo the *Doſe* may b *half* an *Ounce*.

A Cure *for the* Bitings *of a* mad Dog; *by Mr.* Geo. Dampier. *n.* 237. *p.* 49.

3. 1. I have ſent you ſome of the *Herb* you deſired. You muſt look for it in dry Grounds; light and ſandy Ground, where Sheep feed, doth commonly afford it; but my *Uncle* preferred that which grows on good Ground before any other. It is a ſort of *Jews Ear*, which grows on the Ground as cloſe as may be to it, being flat on it; the Moſs and Graſs groweth up about and amongſt it. To uſe it you muſt dry it in an Oven, by the Fire, or in the Sun; then powder it, and paſs it through a Renge or fine Sieve, the which mixed with the like Quantity of fine beaten and powdered *Pepper*, is the *Compoſition*. When given to a *Dog*, the *Dog* muſt firſt be *blooded*, and then *waſhed* well all over, the *Dog* being kept from Meat a convenient while before; then mix it well in a convenient Quantity of *Milk* or *Broth* warm. If it be for any *Cattle* it muſt be alſo *blooded* and well *waſhed*, and given with a *drenching Horn*, and the *Doſe* may be proportioned to the Bigneſs or Strength of the Creature that is to take it. 1. To a *Man* or *Woman* it muſt be given after *Blood-letting*, and well *waſhing* the Face and Hands, or Place that may be *bitten*, or all the Cloaths that a Perſon had on him or her, when *bitten*, to *waſh* away the *Snivel* or *Drivel* that comes from the *Mouth* of a *Dog*, or other Creature when *mad*; for that is the only Reaſon for *waſhing*. A *Man* or *Woman* may take it in warm Milk, Beer, Ale, Broth, or how he beſt likes it, faſting, *two* or *three* ſeveral *Mornings* to make ſure.

After a *Dog* hath *bitten Man* or *Beaſt*, it will not appear or begin to grow *mad* till after a *Full* and *New Moon*, or *New* and *Full*; but when it begins to be *mad*, it is very hardly *cured*. Therefore when you know any thing to be *bitten*, or ſuſpect it to be ſo, uſe the *Remedy* as ſoon as may be after, and then, when given in Time, it prevents all Signs of *Madneſs* at all, which hath made ſome indiſcreet People ſay, it did no good, they believe it would have done well enough without it: But my *Uncle* hath fully confuted that Miſtake ſeveral Times, by not *drenching* a *Dog* of ſmall Worth in a Gentleman's Cry of *Dogs*, which hath died *mad*, and not one of the reſt ſick, but have followed their Maſter's Game rather better than before; and indeed being ingeniouſly prepared and given, it is a moſt *noble* and *infallible Medicine*. I was with my Uncle when a *Dog* had gotten in amongſt a whole Herd of *Cattle* at *Charminſter* by *Dorcheſter*, and had *bitten* ſome, which growing *mad*, and feeding together with their Fellows, when *mad*, the *Drivelling* of them *infected* many more, and the Diſtemper continued almoſt all the Summer amongſt them, ſtill one or two dying and *infecting* more. The *Murrain* was at firſt ſuſpected, and the Cattle were drenched for that Diſeaſe. But my *Uncle* being ſent for, he found 3 or 4 ſick, which he could not *cure*, but ordered all the reſt to be driven 3 or 4 Times through the great River, and all put from the ſame Paſture, till after it ſhould rain a good Shower or two, which would *waſh* away the *Snivel* from the Ground, and then *drenching* them, prevented any farther Evil, for not one was ſick afterward. The whole Herd was near 250, and about 40 died.

A Remark; by Dr. Hans Sloane. *Ib. p.* 52. *Hiſt. Plant. p.* 117.

2. The *Simple* or *Herb* mentioned is not *Jews Ear*, but the *Lichen Cinereus Terreſtris*, deſcribed by Mr. *Ray*. It grows commonly in barren Places all over *England*. The Weight of one ſingle *Doſe* of this *Simple* and the

Pepper mixed communicated to me by Mr. *Southwell*, with Mr. *Dampier's* Leave, is near ℈iv.

Perſons ſuppoſed to be ſtung by Tarantula'*s*; *by Dr*. T. Cornelio; *n.* 83. *p.* 4066.

XL. A judicious Perſon related to me; that being in the Country of *Otranto*, where the *Tarantula's* are found in great Numbers, there was a Man who thinking himſelf *ſtung* by one of them, ſhewed in his Neck a ſmall *Speck*, about which, in a very Short Time, there aroſe ſome Pimples full of a ſerous Humour; and that, in a few Hours after, that poor Man was ſorely afflicted with very violent *Symptoms*, as *Syncopes*, very great *Agitations*, *Giddineſs* of the Head, and *Vomit*; but that, without any Inclination at all to *dance*, and without all Deſire of having any *muſical Inſtruments*, he miſerably *died* within two Days.

The ſame Perſon affirmed to me, that all thoſe that think themſelves *bitten* by *Tarantula's* (except ſuch, as for ſome Ends feign themſelves to be ſo) are for the moſt part young wanton Girls (whom the *Italian* Writer calls *Dolci de Sale*) who by ſome particular Indiſpoſition falling into this *melancholy Madneſs*, perſuade themſelves, according to the vulgar Prejudice, to have been *ſtung* by a *Tarantula*. And I remember to have obſerved in *Calabria* ſome Women, who, ſeized on by ſome ſuch Accidents, were counted (according to the common Belief of that Province) to be poſſeſſed with the Devil.

This brings to my Mind a terrible Evil, which often enough is obſerved in *Calabria*, and is called in their Language *Coccio maligno*. It ariſeth on the Surface of the Body, in the Form of a ſmall *Speck*, of the Bigneſs of a Lupin. It cauſeth ſome *Pain*, and if it grow not ſoon *red* thereupon, it in a very ſhort Time certainly *kills*. It is the common Opinion of thoſe People, that ſuch a Diſtemper befals thoſe only that have eaten Fleſh of Animals dead of themſelves; which Opinion I can from Experience affirm to be falſe. So it frequently falls out, that of many ſtrange Effects we daily meet with, the true Cauſe not being known, ſuch an one is aſſigned, which is grounded upon ſome vulgar Prejudice. And of this Kind I eſteem to be the vulgar Belief of the Cauſe of that Diſtemper, which appears in thoſe that think themſelves *ſtung* by *Tarantula's*.

A contumacious Jaundice, *attended with an odd Caſe in* Viſion; *by Mr*. Samuel Dale. *n.* 211. *p.* 158.

XLI. I here ſend you an Account of my Patient *Grace Dennys*, of *Baxted Magna*, in this County of *Eſſex*. About *Chriſtmas* 1689, after much Grief and Trouble of Mind in the foregoing Autumn, the *Jaundice* began to appear upon her; for which, after having about 9 Months uſed many Medicines, which were told her by divers of her Friends and Acquaintance, but without Succeſs, ſhe in *Sept.* 1690, applied herſelf to me, to whom I adminiſtered divers Medicines, famous in the moſt celebrated Authors for the Cure of the *Jaundice*, and which I had often uſed with Succeſs in the Cure of that Diſeaſe, yet to her they were of no Benefit. After which ſhe had the Advice of ſeveral learned *Phyſicians* in the Country, and likewiſe ſome in *London*: But all that could be done for her hath not yet had any Effect; for her Diſeaſe yet continues, and her Body which uſed to be plump and fleſhy, is now become lean and emaciated, almoſt like a Skeleton, and her Appetite is little and depraved.

In *May* 1691, After an extraordinary *menſtrual Flux* for about 3 *Months*, ſhe began, as ſoon as the *Sun* was *down*, to be deprived of her *Sight* by Degrees until it was quite dark; when although never ſo big a Fire or many Candles were in the Room, yet could ſhe not diſcern the Object, (except a ſmall Shining of Light) and ſo ſhe remained until the *Morning* as one ſtone-blind, when by little and little, as the *Light* increaſed, her *Sight* returned, until the *Sun* aroſe, and then ſhe recovered her perfect *Sight*.

And in this Caſe ſhe continued until *Auguſt* 1692, when being returned from *Epſom*, where ſhe had been drinking the *Waters* for about a *Month*, her *Sight* returned to her again, ſo that ſhe could ſee in the *Night* perfectly. Thus ſhe continued until *January* following, when an extraordinary *menſtrual Flux* again ſeizing her, her *nocturnal Sight* likewiſe left her, and ſhe became *blind* again as formerly.

In *July* 1693, ſhe was ſeized with a *Fever*, when her *Sight* again returned, and continued for about a *Month*, and then left her as formerly; ſo that now in *October* 1693, ſhe hath her *nocturnal Blindneſs* and the *Jaundice* likewiſe continues.

XLII. One Mr. *Morely* of *Bury St. Edmonds*, in an *aſthmatick* Diſtemper, was adviſed by ſome to take down a Spoonful of good *Engliſh Honey*; which being done, the Patient fell into an univerſal *Swelling*, as if he had ſwallowed the worſt of *Poiſons*: Mr. *Goodrich* (who is my Author) preſcribed a common *Sudorifick*, which in competent Time relieved him. And that they might be aſſured that there was nothing amiſs in the *Honey*, they afterwards got the like Quantity at another Place, which was given with the very ſame frightful Event, and the Party was cured with the ſame Kind of *Sweat*.

Divers Inſtances of Peculiarities *both in* Men *and* Brutes; *by Dr.* Nath. Fairfax. *n.*29. *p.* 549.

The like Example hath been more than once related to me by a very credible Perſon of a noble Lady in *Ireland*, who having received a ſmall Hurt on her Leg, and the Chirurgeon (unknown to her) mingling in the Application he made to it, a little *Honey* (for which ſhe had an utter *Averſion*) the Place affected did ſoon after rankle and grow ſo bad, that the Lady was conſtrained to ſend for him that had applied it, who being acquainted with her *Antipathy* to *Honey*, immediately removed that Plaiſter, and applied another with good Succeſs.

By Mr. Oldenburgh. *ib.*

2. Mr. *Twiſſe*, a Miniſter of *Metigham* in *Suffolk*, about 40 Years of Age, having been accuſtomed for ſome time to drink *warm* or rather *hot Beer*, being abroad about *Midſummer*, took off a Cup of *cold Beer*, after he had taken a Pipe of Tobacco. He ſoon after found himſelf *ſick* and *vomited*, and coming Home his *Vomiting* grew worſe, and he was conſtrained to betake himſelf to Bed. Next Day he grew yet worſe, and could find no Help by Phyſick, but yet died the very next Morning. And yet I am informed that the ſame Party could drink *cold Wine*: So that it was not the *Coldneſs* of Particles, ſenſible to the Touch, that killed him.

By Dr. Fairfax. *ib.*

3. Madam *Mary Brook* of *Yoxford* hath ſuch an Averſion to *Waſps*, that whilſt their Seaſon of ſwarming about in Houſes laſteth, ſhe is forced to confine herſelf to a little cloſe Chamber, and dares not then come out to Table,

leſt their coming there ſhould put her into ſuch *Diſtempers*, as *Cheeſe* doth thoſe who have an utter *Antipathy* againſt it.

4. Mrs. *Raymund* of *Stowmarket*, whenever ſhe hears *Thunder*, even afar off, begins to have a bodily Diſtemper ſeize on her; ſhe grows faint, ſick in her Stomach, and ready to *vomit*. At the very coming over of it, ſhe falls into a down-right *Cholera*, and continues under a violent *Vomiting* and *Looſeneſs* as long as the *Tempeſt* laſts. And thus it hath been with this Gentlewoman from a Girl.

5. I know a Woman in *Stowmarket*, who during her *Green Sickneſs* was invited by her *Pica* or *Longing* to ſuck the *Wind* out of *Bellows*, which as often as ſhe could, ſhe took into her Body with open Mouth, forcing it in, by blowing with her own Hands, the *Bellows* inverted: I know another that was for *crackling Cinders* under her Feet. From which Kind of Inſtances I am inclined to doubt, whether that Diſtemper begins at the Deprivation of the acid Liquor in the *Stomach*, and not rather at the *Uterus*, which next infects the *Brain*, ſuch Kind of Things gratifying the *Fancy* ſome Ways miſled more than the *Appetite* natural any Ways depraved.

6. Something like to this is to be found in *Brutes*. In *May* 1667, a *Grey-hound Bitch* at *Britewell Hall*, about 5 or 6 Days before ſhe caſt her Whelps, had ſuch a wild Kind of *Hunger* (though ſhe was fed ſufficiently every Day with uſual Food) that finding another *Bitch's Whelps*, ſhe *devoured* them all, and fell next upon the Bitch herſelf, who made a Shift to get from her. From this, and from a *Sow's devouring* whole Litters of Pigs, I am prone to think otherwiſe of the *Longings* of *Teeming Women*, than is the common Opinion.

Several Obſervations on different Maladies; *by M.* Gaillard. *n.* 233. *p.* 717.

XLIII. 1. There was ſeen at *Tolouſe*, about the Year 1685, an Infant who had 2 Heads; one was a Sort of a Bag, reſembling the *Hood* of a *Benedictine Monk*, and was faſtened to a *Neck* of the ſame Length with the *Neck* of the other *Head*. Mr. *Peter*, ſworn Surgeon, opened it in Preſence of Mr. *Bayle* and Mr. *Corboneau*, the Waters being let out, the *Swelling* vaniſhed; the *Neck* did not ſo, that Part of it which was next to its Original, and which had about the Length of *two Inches and an Half*, was made up of *Fleſh*. This Child *lived* 15 Days.

2. In the Suburb of St. *Cyprian*, near to the Hoſpital of St. *Joſeph of Grace*, Mr. *Soye*, a ſkilful Surgeon, having opened the Daughter of a Cap-maker, dead of the *King's Evil*, *April* 1685, remarked, that the *Glands* of the *Meſentery* were *petrified*, moſt of them were about the Bigneſs of a Wallnut, and others of a ſmall Nut; in ſome of them, being opened, he found about a Dozen of *Stones*.

3. Mr. *Bouſquet*, Citizen of *Tolouſe*, being dead, on the 8th of *March* 1686, of a continual *Fever*, and a *Spitting* of *Blood*, accompanied with a *Difficulty* of *Breathing*, Mr. *Delpech*, ſworn Surgeon, opened him, and found in the Right *Kidney* 3 little *Stones*, and ſome *Gravel*: Going down the *Ureter*, which was much enlarged, he found a Tough *Stone*, of the Bigneſs of a Bean lodged towards the lower Orifice of the ſame Paſſage: The *Lungs* ſtuck to the *Pleura*, to the *Mediaſtin*, the *Diaphragm* and *Pericardium*: The *Wind-pipe* was full of *Blood*; there was ſeen in the Left Lobe, and the

ack Part of the *Lungs*, a *Bony* Subſtance 2 *Inches* long, and *half* an *Inch* Broad: There were two *Polipuſes* in the *Heart*, one in each *Ventricle* of the bigneſs of a Pigeon's Egg, whoſe Roots were 10 *Inches* long, the *Vena Cava*, both *aſcendent* and *deſcendent*, was covered at its Entry into the left *Ventricle* of the *Heart*, with a *Bony* Matter.

4. Mr. *Soye* having in *May* 1689, opened the *Vena Baſilica* of the Right Arm of Madam *de St. Paul*, a Religious of the Hoſpitalers of *Paris*, obſerved a little *black Blood* that ſtopped the Orifice he had made, and being willing to take it away to open the Paſſage, he found that it was a *Polypus* 10 *Inches* long.

5. In *Sept.* 1687, the Sieur *Soye* having in the *Hoſpitalers* opened a Servant Maid, aged between 25 and 26, which was from Time to Time ſeized with a *bloody Flux*, he found the *Colon* and Part of the *Meſentery ulcerated.* The Mouth of this *Ulcer* was ſo great, that one might eaſily thruſt in his Fiſt at it. It was ſtopped with a Clue of *Worms* greater than it.

6. There happened much about the ſame Time a Paſſage, ſingular enough, in that Monaſtery, M—— having ſtopped on a ſudden a Flux of Blood in Madam *Maria*, who had her *Catamenia* (though ſhe had a continual *Fever* and a *Bleeding* at the *Noſe*) before he had uſed general Medicines, ſhe fell all on a ſudden into an *Apoplexy*, and dying quickly after, M. *Soye* opened her, and found in the lateral *Sinus*, which divides the *Brain* from the *Cerebellum*, a *Clot* of *Blood* as big as a Hazel-Nut. All the Veſſels of the *Brain* were very much ſwelled and full of *clotted Blood*; as for the *Ventricles*, they were full of a *ſerous* Humour, being about the Quantity of a *Setier*.

7. Madam *le Gendre*, who died a Maid of 18 Years old, about the End of *Nov.* 1693, was ſubject to great *Head-achs*, and almoſt continual Faintings, and *convulſive Fits*; and the two laſt Years of her Life ſhe was ſo ſtrongly ſeized with them, that ſhe became *blind* of them, and continued in that Condition two or three *Months*. After Death ſhe was opened by M. *Soye*; and when he came to the *grey* Subſtance of the *Brain*, he found above the *Ventricles*, between the *cortical* Subſtance and the *callous Body*, a *Lump* of *Fleſh* reſembling the Stomach of a Gooſe. Immediately after the *callous Body* in the foremoſt *Ventricles* did appear an *Ulcer*, from which came out about a *Setier* of Matter.

8. In the Beginning of *Sept.* 1695, M. *Soye* opening the *Gall-Bladder* of a Widow of 19 Years old, he found there a *Stone* altogether like a Hen's Egg; that Part of the *Liver* which was near, was hurt, and her *Matrix* ſchirrous. She had for 2 Years the *Yellow Jaundice*.

9. The ſame M. *Soye* having in *Sept.* 1696, opened a Child of M. *Roye* Notary, found in the *Ventricles* of the *Brain* a *Setier* of *Water*.

10. In another Child of Mr. *Hugonien*, Woollen Draper, which he opened much about the ſame Time, and which was about 2 Years old, he found in the *Right Ventricle* of the *Heart*, a *Polypus* as big as a Pigeon's Egg, and in the *left Ear coagulated Blood* of the Bigneſs of a Wall-nut: He found moreover in the little *Lobe* of the *Lungs* two *Ulcers* very diſtinct, from each of which there iſſued a *Setier* of Matter. The *Ureter* of the *Left Kidney* was

diſtended an *Inch*, and its Paſſage ſtopped by *Phlegm*, ſo hardened that ſcarcely could a Knife cut it.

11. Madam *de l' Etcarre*, about 26 Years of Age, and ſubject to great Diſeaſes, was opened in the Beginning of *Oct.* 1695, by M. *Soye*: He ſaw the Veſſels that brought the Blood to the *Membranes* of the *Brain* were greatly ſwelled, and full of *Polypus's*; of them we drew out 12, ſome 4 *Inches* long, and ſome 3.

12. In the Beginning of the Year 1697, the Wife of M. *Maſoc*, Merchant, being 40 Years old, who had 4 or 5 Children, had the ſame *Symtoms* which happen to Women near their *Labour*. M. *Soye* was called to her, and ſeeing that ſhe ſuffered ſuch a Loſs as happens to Women before their bringing forth, or upon ſome Hurt, made ready for *laying* of her. We ſaw preſently a *falſe Conception*, which appeared at the inner Orifice of the *Matrix*: This he pulled out, perceiving it looſe from its Ligaments. This *falſe Conception* was of the Bigneſs of a Gooſe Egg, and ſhaped like a *Kidney*: There was alſo ſo great a Similitude between the Structure of the *Kidney* and this Maſs of Fleſh, that the Fibres were wholly alike. This Woman ſaid, that this *falſe* Conception had been *two Years* in her *Matrix*. After it was out, ſhe had the ſame *Loſs* of *Blood* as in her other *Lyings-in*, and keeping to the ſame Courſe as ſhe uſed in ſuch Occaſions, ſhe had no bad Conſequences of it.

13. There was obſerved in a Child newly born, and in due Time, that it had nothing of the *Bone* in the Hind-part of the *Head*, the *temporal Bones*, nor of the *frontal Bone* as far as the *Eyes*; ſo that the *Eyes* made an Appearance of two Horns, which the Calves have when they come in the World, which ſtanding much out, made the Child's Face very *monſtrous*. In the *temporal Bones* there was nothing ſeen but what encloſed the *Organ* of *Hearing*: Upon laying the Hand upon it, was felt the *Beating* of the *Arteries*, and the Veſſels which watered the *Pia* and *Dura Mater* were ſeen diſtinctly, as if the *Bone* had been taken off. This Child *lived* in this State 4 or 5 *Days*.

14. Mr. *Soye* the younger, a Surgeon, having opened a young Girl, found her *Matrix* ſo *ſchirrous* that it ſeemed to be made but of one Piece.

15. The ſame obſerved ſince ſuch a Thing in a Girl 2 Years old, that died of an *Apoplexy*; he found alſo 4 *Glands* in the *Meſentery* of this Maid, each as big as a Wall-nut. He has ſince ſeen that the *Meſentery* of a Child 7 or 8 Years old, was made of 2 *Glands* each of the ſame Bigneſs.

16. Mr. *Barriere*, Sworn Surgeon, found in a Girl 11 or 12 Years old, inſtead of a *Matrix*, a very thin *Membrane* placed where the *Matrix* is. The *Vagina* in the outward Orifice was ſhut up hermetically; *i. e.* the Cover was of the ſame Piece with the *Matrix*.

17. Mr. *Carlan*, Sworn Surgeon, having obſerved in a Man a *Swelling*, as big as a Pullet's Egg, upon the Place called *Fontanella*, and covered with *Hair* like the reſt of the Head, applied to it *Emplaſtrum de Betonica*, by Order of M. *Dufaur*, Profeſſor of Surgery, and the *Swelling* diſappeared.

XLIV. *Papers of leſs General Uſe*, omitted.

1. SEveral *Anatomical Inventions* and Obſervations aſſerted to their proper *n.* 35. *p.* 672.
Authors; by Dr. *Tim. Clark*, viz.

1. Of the *Vaſa Lactea*, to *Aſcellius*.

2. Of the *Ductus Toracicus*, to *Pecquetus*.

3. Of the *Vaſa Lymphatica*, to *Bartholinus* and *Rudbeckius*; yet theſe *Lymphaticks* were obſerved, in the *Teſticles*, by *Jolive*, ſome Time before.

4. Of the *Circulation* of the *Blood*, to *Harvey*, not to *P. Paulus Venetus*.

5. Of the *Injection* of *medicated Liquors* and other things into the *Veins* of Animals to Sir *Chr. Wren* about the latter End of the Year 1656, if not to Dr. *Potter* about 18 Years before.

6. In the Proſecution of this laſt kind of *Operations*, both Dr. *Clarck* and Dr. *Henſhaw* attempted, about that Time, the *Tranſfuſion* of *Blood* from one Animal into another, but unſucceſsfully, till Dr. *Lower* hit upon a more practical Method, and *performed* the *Operation* at *Oxford*. An. 1666.

2. Several Hiſtorical Paſſages, concerning the *Invention* of *Injection* into *n.* 7. *p.* 128.
the *Veins*, and *Tranſfuſion* of the *Blood* of Animals; by Mr. *Oldenburgh*. *n.* 27. *p.* 489.
Where the *Invention* of the firſt is given to Sir *Chr. Wren*, and the *ſucceſsful* *n.*28. *p.* 523.
Practice of the Latter, to Dr. *Lower*; except this Honour may be allowed to *n.* 37. *p.* 731.
Libavius, who indeed deſcribes the Operation upon Men plainly enough (in
his *Defenſio Syntagmatis Arcanorum Chymicorum*, &c. p. 8. *Edit.* An.
1615) but it is only to mock at it.

3. Queries and Trials propoſed by Mr. *Boyle* to Dr. *Lower*, to be made *n.* 20. *p.* 357.
by him, for the Improvement of *tranſfuſing Blood* out of one *live Animal* *n.* 22. *p.* 385.
into another.

4. A Letter from M. *Gaſper de Gurye de Montpoly* to M. *Bourdelot*, con- *n.* 28. *p.* 517;
cerning neceſſary *Circumſpection* to be uſed in the Practice of *Tranſfuſion* up-
on *Men*.

5. The *cautious* Proceedings of the *Engliſh* in the Practice of *Tranſfuſion* *n.* 28. *p.* 521;
upon *Men*.

6. A printed Letter of M. *Gadroys* to M. *Bourdelot*; being an Anſwer to *n.* 30. *p.* 559.
a Paper of M. *Lamy*, and a Vindication of the *Tranſfuſion* of *Blood* from his
Objections.

7. A printed Paper, written by *J. Denis*, touching a late Cure of an *n.* 32. *p.* 617.
inveterate Phrenſy by the *Tranſfuſion* of *Blood*; and the Proceedings of the *n.* 36. *p.* 710.
Court of *Juſtice* at *Paris* upon the *Death* of the Man, after he had under- *ib.* *p.* 712. *n.* 54. *p* 1075.
gone that Operation twice or thrice.

8. Experiments of *Stanching Blood* with the *Royal Stiptick*; extracted *n.* 95. *p.* 6054.
from M. *Denis*'s 11th *Conference*, printed in *French* at *Paris*, *Apr.* 30,
1673.

XLV. *Accounts of Books* omitted.

1. MEmoirs for the Natural Hiſtory of *Human Blood*, eſpecially the *n.* 154. *p.* 428.
Spirit of that Liquor; by the Hon. *Rob. Boyle*, Eſq; *Lond.* 1683.

2. Apologia pro *Circuitione Sanguinis*, qua reſpondetur *Æmilio Pariſano*, *n.* 173. *p.* 1105.

Medico *Veneto*: Auth. *Geo. Entio.* Editio altera, auctior & accuratior. *Lond.* 1685, in 8*vo*.

n. 58. p. 1200. 3. *Joh. Sig. Elſholtii Clyſmatica Nova*; ſive Ratio in *Venam* Sectam *Medicamenta Immittendi. Coloniæ Brandenburgicæ*, 1667, in 8*vo*.

n. 4. p. 75. 4. Diatribæ *Th. Williſii*, M. D. & Profeſſ. *Oxon.* de *Febribus*, Vindicatio: Authore *Rich. Lower*.

n. 12. p. 210. 5. Dr. *Sydenham*'s *Methodus Curandi Febres*, propriis Obſervationibus ſuperſtructa.

n. 123. p. 568. 6. Obſervationes Medicæ circa *Morborum Acutorum* Hiſtoriam & Curationem; Auth. *Thom. Sydenham*, M. D. *Lond.* in 8*vo*.

n. 197. p. 657. 7. Novæ Hypotheſeos, ad Explicanda *Febrium Intermittentium* Symptomata & Typos excogitatæ Hypotypoſis: Una cum Ætiologia Remediorum, ſpeciatim vero de Curatione per *Corticem Peruvianum*. Acceſſit Diſſertatiuncula de *Inteſtinorum* Motu *Periſtaltico*. Auth. *Gulielmo Cole*, M. D. *Lond.* 1693, in 8*vo*.

n. 199. p. 717. 8. ΠΥΡΕΤΟΛΟΓΙ'Α; ſeu Exercitationes de *Morbis* Univerſalibus *Acutis*. Auth. *Rich. Morton*, M. D. *Lond.* 1692, in 8*vo*.

n. 217. p. 123. 9. *Archibaldi Pitcarnii*, M. D. Diſſertatio de *Febribus*.

n. 73. p. 2210. 10. Diſſertationes duæ Medicæ de *Veneno Peſtilenti*: Studio *Caroli de la Font*, M. D. in Acad. *Avenion*, Prof. Primar. *Amſtel.* in 12*mo*.

Ib. p. 2212. 11. *Franc. de le Boe Sylvii*, M. D. Oratio de *Affectus Epidemici*, Anno 1669, *Leidam* Depopulantis, Cauſis Naturalibus. *Ludg. Batav.* 1670, in 12*mo*.

n. 81. p. 4028. 12. Λοιμολογία, ſive *Peſtis* nuperæ *Londini* Graſſantis Narratio Hiſtorica. Auth. *Nathan. Hodges*, M. D.

n. 101. p. 14. 13. *Medicina Militaris*; or a Body of *Military Medicines* experimented, by *Raymundus Mindererus*: *Engliſhed* out of *High-dutch*, *Lond.* 1674, in 8*vo*.

n. 136. p. 918. 14. Tractatus Medicus de *Morbis Caſtrenſibus* Internis. Auth. *Joh. Valentino Willio. Hafniæ*, 1676, in 4*to*.

n. 226. p. 475. 15. An Account of the Nature, Cauſes, Symptoms, and Cure of the *Diſtempers* that are incident to *Sea-faring People*; with Obſervations on the *Diet* of the *Seamen* in his Majeſty's *Navy*; illuſtrated with ſome remarkable Inſtances of the *Sickneſs* of the *Fleet*, during laſt Summer, Hiſtorically related. By *Will. Cockburn*, M. D. 1696, in 8*vo*.

Ib. p. 478. 16. A Continuation of the Account of the Nature, Cauſes, Symptoms, and Cure of the *Diſtempers* that are incident to *Sea-faring People*: Illuſtrated with ſome remarkable Inſtances of the *Sickneſs* of the *Fleet*, during laſt Summer, Hiſtorically related. To which is prefixed an Eſſay concerning the *Quantity* of *Blood* that is to be evacuated in *Fevers*; being the 3d Part of the Work. By *Will. Cockburn*, M. D. *Lond.* 1697, in 8*vo*.

n. 228. p. 545.
n. 226. p. 470. 17. *Marcelli Malpighii* Opera *Poſthuma*, Fig. æneis illuſtrata: Quibus præfixa eſt ejuſdem *Vita* à ſeipſo ſcripta, *Lond.* 1697, in *Fol.*

CHAP. VI.

The Bones, Joints and Muſcles.

I. I Have lately ſeen in *France*, Part of an *human Skeleton*, conſiſting of the *Os Ilium*, the *Os Sacrum*, the 5 *Vertebræ* of the *Loins*, 10 of the *Back*, 5 entire *Ribs* on the Right Side, and 3 on the Left; the Bottoms or Ends of the other were cloſely *united* to the tranſverſe *Apophyſes* of their *Vertebræ*: The *Vertebræ* of the *Neck*, the *Claviculæ* and *Sternum* were wanting. All theſe *Bones*, which naturally are 38 each ſeparate and diſtinct from another, were here ſo ſtraightly and intimately *joined*, their Ligaments perfectly *Bony*, and their *Articulations* ſo effaced, that they really made but one uniform continuous Bone; ſo that it was as eaſy to break one of the *Vertebræ* into two, as to diſjoint or ſeparate it from the other *Vertebræ*, or the *Ribs*, or the *Os Sacrum* from thoſe of the *Ilia*. Nor could I obſerve any greater Diſtinction between all the *Bones*, than is uſually ſeen in adult Perſons between the *Os Pubis*, the *Iſchion* and *Ilium*, which are but one entire Bony Subſtance. The Roots of all the *Ribs* made but one equal, ſmooth, and plain Superficies with the *Vertebræ* and their *Apophyſes*. The Oblique *Apophyſes* of all the *Vertebræ* were ſo confounded and loſt, that it was not poſſible to obſerve any Marks of them. The *Cartilagineous* Edge of the *Vertebræ* themſelves was turned to perfect *Bone*. But when I had ſawed two of the *Vertebræ* aſunder at the *Commiſſure*, I found this Uniting did not enter above two Lines deep, and that afterwards their Middles were ſeparated as they uſually are, and touched each other only at the Edges, which was raiſed up a little above the middle Part. On the left Side, at half a Finger's Breadth from the *Vertebræ*, two *Ribs* were joined together for the Space of an *Inch*, and afterward ran ſeparated and parallel like the reſt, to the *Sternum*. The Figure of this *Trunk* was crooked, and making Part of a Circle, the *Spinæ* making the Convex, and the Inſide of the *Vertebræ* the Concave Part of this Segment. The Direction of the *Ribs* was unnatural; for inſtead of terminating at the *Sternum* in parallel Semicircles nearly Horizontal, their Extremities, where they reached the *Sternum*, dipped ſo much down toward the *Hypogaſtrium*, as to touch the Sides of the *Oſſa Ilium*.

The Bones *of a Skeleton* united, *without* Jointing *or* Cartilage; *by Dr.* Bern. Connor. *n.* 215. *p.* 21.

This *Trunk* had been found in ſome Church-yard or Charnel-houſe, as appeared by its dark, red Colour and Drineſs, and ſeemed to be of a grown Perſon, the *Bones* being of a Proportion and Thickneſs equal to thoſe of old Men. The *Vertebræ* of the *Loins* were larger than thoſe of the *Back*, as they naturally are; there was no unnatural Bunching out; their Joining together very regular; no one *Vertebra* ſtanding out beyond the other, either before, behind, or on the Sides. The Cavity for the *Spinal Marrow* had no Fault, but its bending Figure. The *Bones* of the *Os Pubis* were ſeparated as uſually. The *Socket*, or Cavity of the laſt *baſtard Rib* on the Right Side being ſmooth and poliſhed, ſeemed as if that *Rib* had not been ſo firmly united as the reſt. In the Extremity of the *Ribs* next the *Sternum*, the uſual Cavities for the *Cartilages* to move in, were obſervable, which, as it ſeems by this, were not *Bony*, nor continuous with the *Ribs*. It is hard to give a mechanical Reaſon of this ſo ſecret and hidden a Matter. That theſe *Bones* were thus *united* after the Death of the Perſon in the Ground is hardly to be allowed. Pure Earth, being made up only of friable porous irregular Particles, can but ſuck up the ſuperficial Moiſture of the *Ligaments* of this *Trunk*, otherwiſe, by Evaporation in the Sun, *Ligaments* and *Cartilages* would become *Bony*; and the Earth is never ſo ſtyptick as to procure ſo intimate an Union. If you will ſay the Earth was impregnated with ſome Principle capable to produce this Effect, it muſt be either *Water*, *Sulphur*, or *Salt*; neither of which ſeem proper to cement *Bones*: All knowing that *Water* and *Sulphur* are ſo far from hardening Ligaments, that they rather ſoften and relax by their ſlippery and fluid Particles. Nor are *Alkali's* or *Acids* capable to turn them to *Bone*: For *Alkali's* being briſtly, ſtiff, and inflexible, are properer to ſeparate than unite, as is ſeen by putting a Piece of *Ligament* into any *Alkaline Salt*. And, Secondly, *Acids* are moſt proper to break the Texture, and divide even the hardeſt Bodies, and upon Experiment *Cartilages* are diſſolved in them: Beſides, could this Effect have been produced in the Earth, why was not the whole Body turned to *Bone*?

As to the *crooked* and *bending Shape* of this *Skeleton*, it is reaſonable to ſuppoſe that it proceeded from the firſt Formation of the *Fœtus* in the *Womb*, from the *Egg*'s not having ſufficient Room, or being accidentally preſſed by ſome *Abſceſs* in the *Womb* or elſewhere; ſo that the *Carina* of the *Back-bone*, inſtead of running ſtraight, was bent into a Circle, and kept the ſame Figure when at full Growth that theſe *Bones* had taken when ſoft and tender. Hence the Situation of the reſt may be fairly deduced; as the drawing down of the *Ribs* and *Sternum* to the *Oſſa Ilium*. And from theſe *Vertebræ* and other *Bones* being thus preſſed upon each other, and ſo rendered unmoved, the Cauſe of their being *united* into one *Bone* might be this, The *Pores* of ſuch tender Parts being eaſily ſtopped, ſo that the Blood and other Humours could not paſs, and upon that Account the *Cartilages* of the *Vertebræ* becoming dry, *united* into one Piece. By the ſame Reaſon the *Ribs* being preſſed againſt the *Vertebræ* for ſeveral Months, and without Motion in the *Womb*, could receive and admit little or no Moiſture between them; whence their *Cartilages* became hard and *united*, and in Time *Bony*, as ſeveral other *Bones* of the Body do, though they were but *Griſtles* when in the Womb.

From this Conſtruction of the Parts it neceſſarily follows, that the Body of this Perſon muſt have been *immoveable*; that he could neither *bend* nor *ſtretch* himſelf out, riſe up nor lie down, nor turn upon his Side, having only the Head, Feet and Hands *moveable*. If it be objected, that *Reſpiration* could not be performed when the *Ribs* were thus *immoveable*, this Difficulty may be obviated by obſerving, how little Motion of the Breaſt is neceſſary to continue the *Motion* of the *Blood* through the *Lungs*, as is viſible in *Hyſterick Fits*, *&c.* Again, the *Ribs* of this *Skeleton*, though fixed at the Center, might yet be moved at the Ends, and ſo the *Thorax* enlarged by a much leſs Strength than that of the *Muſcles* uſed for that Purpoſe: Beſides, the *Diaphragm*, the chief Organ of *Reſpiration*, in this Subject was free in the acting. But it is likely this Perſon *breathed* very *ſhort*, the Quickneſs of the Returns ſupplying the Defect of a large Draught of *Air* at once: And poſſibly the *Foramen Ovale* might continue open, and that by it and the *Arterial Canalis* the *Blood* might paſs from the *Cava* to the *Aorta*, but a Part of it paſſing through the *Lungs*, as I have lately obſerved in a Girl of 4 or 5 Years old, in whom the *Foramen Ovale* was but half cloſed up, and in the Form of a Creſcent.

To this may be added another Obſervation of the *Bones* of the *Thigh* and *Leg*, growing together in an adult Perſon, the Place of their *Joining* being much more Solid than any other Part. Theſe *Bones* were ſo *bent* at the *Knee* as to make an acute Angle, yet were they without any *Exoſtoſis*, Rottenneſs, Fracture, or unnatural Figure. It is more ſurprizing to find the *Knee*, whoſe Motion is free and large, to be thus *united*, than the *Ribs* of the *Skeleton* whoſe Motion is obſcure and ſcarce ſenſible. Some thought that this might proceed from an *Ulcer* in the *Knee*; but an *ulcerous* Matter is very unfit for the *joining* of the *Bones* together; and I have obſerved an *Ulcer* in the *Knee* making ſuch Havock, that the *Thigh* and *Leg* hung together but by the *Skin*. Theſe *Bones* ſeemed too ſound to ſuppoſe the Perſon had a wooden Leg, which by continual kneeling upon, might make the *Bones* unite: Beſides, this Accident is no more likely to befal a Perſon uſing a wooden Leg than any other, ſince the *Muſculi flexores & extenſores Tibiæ* act alternately in each Step, which is ſufficient to hinder the growing together of the *Joint*.

This Union of the *Bones* ſeems alſo to proceed from ſome Accident in the Womb; perhaps the *Knee* of this *Fœtus* being too much bent and preſſed againſt the *Thigh-bone*, was hereby united, after the ſame Manner as we have before explained that of the *Back-bone* and *Ribs*.

Explication of the Figures.

Fig. 76. *a a a a*, *b b b b*, *c c*, The *Vertebræ* of the *Neck*, *Back* and *Oſſa Ilium*, all *joined together*. *d d d d*, ſeveral of the *Ribs united* to the *Back-bone*. *Fig.* 76.

Fig, 77. *g g g*, The Place where the *Os Femoris* and *Tibiæ* were *united*. *Fig.* 77.

Bony Excreſcencies *on a Human* Scull; *by M.* Dupré. *n.* 251. *p.* 138.

II. 1. *Nicholas Brodes*, of 30 Years of Age, having been afflicted for the Space of 10 Years with an inceſſant *Head-ach* (which for the laſt 12 Months before his Deceaſe had been more violent than formerly, and deprived him of his *Sight*) upon the 15th of *March*, 1697, was received into the *Hotel Dieu*: After his Head was ſhaved, there appeared a large *Tumour*, which extended itſelf over the hairy Scalp. In the Midſt of the left *Parietal-Bone*, there was the Pulſation of an Artery, and a ſmall Fluctuation, the reſt of the Tumour being exceeding hard. M. *Dupré* fearing this might be an *Aneuriſm*, was unwilling to open the *Tumour* till he was conſtrained to it, by the importunate Intreaties of the Patient, who choſe rather the Hazard of his

Life, than any longer to endure ſo exquiſite a Torment. As ſoon as an Aperture was made, there iſſued out a Quantity of thick concreted Blood, which wet the Bolſters at every Dreſſing. The 3d Day he felt a hard Body with his Probe, looſe in the Fleſh, which being taken out, appeared to be a ſmall Fragment of a *Bone* exfoliated, reſembling a ſmall Comb-bruſh. Upon the 4th Day the Patient died. In diſſecting the Head, the *tumified* Part of the *Skull* appeared to riſe more than an Inch above the ſound *Bone*. The whole Swelling of the *Cranium* was made up of ſeveral Subſtances, not unlike little *Horns*, or innumerable ſmall hollow Cones, with their Points downwards; beſides a great Number of *bony Fibres*, ſtraight, ſtiff and pointed, reſembling the *Teaſels* uſed by Cloth-workers. In the next Place there were ſeveral *Holes*, ſome of which perforated the *Skull*, others not. There was no Diſtinction of the *Sutures*. The *Meningies* were mortified and confounded together, and in Part adhered to the *bony Excreſcencies* of the left *parietal Bone*; nevertheleſs the *Brain* was ſound and entire. The Inequalities of the inner Surface of the *Cranium* reſembled melted Metal poured down from a conſiderable Height, on a light moving Sand; or the Inſide of a *Grotto*, in which the Stones jet out in an irregular Manner. The whole Left Side had loſt its natural Figure, and the Right had only a few Impreſſions made by the beating of the *Arteries* of the *Dura Mater*.

There was no Appearance, on an exact Search, of any *Venereal Diſtemper* to be found, whence theſe *Excreſcencies* might be ſuſpected to proceed. It is therefore probable that the Blood-Veſſels of the *Diploe* might be burſt by ſome accidental Blow on the Head, or eroded by ſome Acidities of the Humours, and the Blood be extravaſed in its Cells: This ſtagnating, and by Degrees arriving to a very high Degree of Corruption, it is not much to be admired that the more ponderous Part (by its great Acidity) ſhould diſſolve the contiguous *Bone*; and after it has penetrated that, by eroding ſuch nice and ſenſible *Membranes*, as the *Pericranium* and *Dura Mater*, cauſe exquiſite *Pains*.

To explain theſe Irregularities of the *Skull*, it may be conſidered, that its upper Plate is compoſed of *Strata* of *Bony Fibres*, lying parallel to each other, and of an arched Figure. Now when the volatile Acid ſublimes, and diſſolves one End of the *Bony Fibre*, it muſt, by its Elaſticity, ſpring up and become erect on the other. If more of theſe happen to have thoſe Ends which remain on the *Cranium* around one Point, they form the ſmall *Cones* above-noted, by Means of a *Viſcous Water* which cements them together, and fills up their Interſtices: On the contrary, if they ſtart ſeparately, they form a *Capillary* Appearance.

Remarks on theſe Excreſcencies; *by Mr.* William Cowper. *Ib. p.* 140.

2. *Excreſcencies*, not unlike this of the *Skull*, have been obſerved in moſt other *Bones* of the Body (the *Os Petroſum*, *Incus*, *Malleus*, *Stapes*, &c. not excepted) and the Diſeaſe is commonly called *Spina Ventoſa*. It is remarkable, that the *Bones* of *Children* and young Bodies (eſpecially their Appendages) are more ſubject to the like Accidents than thoſe in Years; by reaſon their *Fibrillæ* are much ſofter and apt to extend, whereby that Part of the *Bone* itſelf grows tumid, and frequently becomes *carious*; and this probably might give Occaſion for impoſing the Name of *Pædarthrocace* on that Diſeaſe, which

is vulgarly called the *Joint-Evil.* When the *Cartilages* on the Extremities of *Bones* in their Articulations are eroded (and their Appendages thus diſeaſed) the *Bony Fibres* ſometimes germinate and *unite* both Bones, in ſuch a manner that they afterwards appear to be one continued one, as I have ſeen in the *Hip* and *Thigh-bone* ; and again, in the *Thigh-bone*, the *Tibia* and *Patella*, and frequently in the *Oſſa Tarſi*, *Metatarſi*, and *Bones* of the *Toes* ; many Inſtances of which are mentioned by Writers, in the *Vertebræ* and other *Bones.* This *Unition* of *Bones*, at their Articulations, may alſo happen through a Defect of the Mucilage.

The *Germination* of *Bony Fibres*, after any peccant Matter has deſtroyed ſome of them and relaxed others, is no more ſurprizing than the *fleſhy Inequalities* we commonly meet with in hollow Ulcers of the ſofter Parts, as in the *Membranes*, *Muſcles*, *Glands*, &c. Beſides the *Inequalities* on the Surfaces of *Bones* thus affected, and their being very much diſtended, I have frequently ſeen divers large *Holes* in them (beſides thoſe for the Tranſit of the Blood-Veſſels) ſome of which have paſt quite through them. The like has been obſerved in both Tables of the *Skull*, as M. *Dupré* has taken Notice, where Part of the *Bone* has been diſſolved into an *ichorous* Matter, which ſometimes has happened, and the *external Teguments* not been injured.

Vid. Anat. of human Bodies. *Tab.* 93. *and Introd.*

III. 1. *Joſeph Shute*, Clerk, Parſon of St. *Mary* (nigh *Plymouth*) in the County of *Devon*, Aged 81 Years, being a temperate Man, and of a healthy Conſtitution, perceiving that his Mouth, about 3 Years ago, was ſomewhat ſtreightned, found that he had a *new Tooth* (the 3d Grinder) being the innermoſt of the upper Jaw in the right Cheek, which ſtill remains firm.

New Teeth *in 2 aged Perſons ; by Mr.* Colepreſs. *n.* 21. *p.* 380.

2. *Maria Stert* of *Benecliffe*, in *Plympton* St. *Mary* (near *Plymouth*) in *Devon*, aged about 75 Years, an healthy Perſon, having had 9 Children, about the 40th Year of her Age loſt 3 of her upper *Inciſors* or Cutters, the other drawn out, and ſo remained Toothleſs, as to them, for about 25 Years, when ſhe perceived that a *new Tooth* came forth (without any Pain) next the *Canini* of the left Cheek : And about 2 Years after, another *Tooth* grew out likewiſe without Pain, cloſe by the former. The firſt whereof never came to above half the Length of her former *Cutters*, the latter ſcarce breaking the Skin : Both which yet proved ſerviceable, till about 6 Weeks ſince, when ſhe eating (no hard, cruſty, or ſolid) Meat, that *Tooth*, which came out firſt, fell down into her Mouth, without any Looſeneſs beforehand perceived, or any Pain ; which had not a *Phang* like other *Cutters*, but much leſs and ſhorter. The other abides firm, and is ſerviceable.

IV. In the *Pall-Mall* at *London*, lived one *Clarke* (called the *Poſture-Maſter*) that had ſuch an abſolute *Command* of all his *Muſcles* and *Joints*, that he could *disjoint* almoſt his whole Body ; ſo that he impoſed upon our famous *Mullens*, who looked on him in ſo miſerable a Condition, that he would not undertake his Cure. Though he was a well-grown Fellow, yet he would

A remarkable Inſtance of an abſolute Command *of the* Joints *and* Ancles ; *by* —— *n.* 242. *p.* 622.

appear in all the *Deformities* that can be imagined; as *Hunch-back'd*, *Pot-belly'd*, *Sharp-breaſted*. He *diſjointed* his Arms, Shoulders, Legs, and Thighs, that he well appeared as great an Object of Pity as any; and he has often impoſed on the ſame Company where he had been juſt before, to give him Money as a *Cripple*; he looking ſo much unlike himſelf that they could not know him. I have ſeen him make his *Hips* ſtand out a conſiderable Way from his *Loins*, and ſo high that they ſeemed to invade the Place of his *Back*, in which *Poſture* he has an extraordinary large Belly. He turns his *Face* into all *Shapes*, ſo that by himſelf he acts all the uncouth, demure, odd Faces of a *Quaker*'s *Meeting*. He began *young* to bring his Body to it; and there are ſeveral Inſtances of Perſons that can move ſeveral of their *Bones* out of their *Joints*, uſing themſelves to it from *Children*.

The great Tendon *above the* Heel, *after an intire Diviſion of it,* ſtitched *and* cured; *by Mr* Will. Cowper. *n.* 252. *p.* 153. *Fig.* 78.

V. *Feb.* 1. 169$\frac{8}{9}$, I was called to *Tho. Wheatly*, a Carpenter, Aged 30 Years, who had totally *divided* the great *Tendon* of the *Muſculi Gaſtrocnemii* of the Left Leg, about 3 Fingers Breadth above the *Os Calcis*. I found the upper Part of the *Tendon* withdrawn from the inferior at leaſt 2 *Inches*. I was obliged to divide the external Teguments *a*, *b*, to come at the Ends of the *divided Tendon* A, B: This done, the firſt Needle C (with ſtrong Silk in it well waxed) I paſſed through the Body of the *Tendon* A, about half an Inch above its divided Extremity: The 2d Needle and Silk D, was thruſt thorough this upper Part of the *Tendon*, a little under the former, leſt the two Threads, or Silks, ſhould meet each other at their Decuſſation in the Middle of the *Tendon*. Afterwards both theſe Needles were paſſed thorough the lower Part of the *divided Tendon* B. The Foot being held extended, the two Ends of the *Tendon* were applied to each other, by the Aſſiſtance of the Ligatures C, D, which were ſo tied, as to keep the divided Parts cloſe together, whilſt the Foot remained in this Poſture. After the 4 Ends of theſe Ligatures were cut off, I found it was neceſſary to bring the Sides of the divided Skin nearer each other with one ſingle Stitch, a little above the Suture of the *Tendon*. This done, a Pledget of Lint dipt in *Balſam* of *Turpentine* was laid on the Wounds, and another large Pledget of Flax, armed with *Linimentum è Gummi Elemi* over it. After the Application of common Bandages, Bolſters, &c. I found it was neceſſary to place a thick Piece of Paſtboard, of a convenient Arched Figure, on the Fore-parts of the Foot and Leg, to keep the Part inflected, and to prevent any Motion of it, which might break out the *Stitches* in the *Tendon*. He complained very much in paſſing the Needles through the upper Part of the *divided Tendon*; tho' its middle and internal Part at the Diviſion was ſcarce ſenſible of the Touch of my Finger: But he had no Pain in paſſing the Needles through the lower Part of the *Tendon*. After 14 Ounces of Blood was taken from his Arm, I left him on his Bed. Six Hours after (which was about 8 at Night) I found his Pulſe ſomewhat quicker than before: He then took an Ounce of *Syrup de Meconio*. The next Morning I found him in no ill Condition. He told me that he had got ſome Sleep that Night, but was often awakened with Twitchings in the Calf of the wounded Leg. The 3d Day after the Operation, I dreſſed the Wound with the ſame Applications as before, only uſing a Fomentation made of a Decoction of *Wormwood*, *Sage*, *Roſemary*, *Bay-Leaves*, &c. On the 4th Day after the Operation, I found the Applications on the Wound very wet with a ſerous Humour, commonly called a *Gleet*. On the 6th Day the Matter became ſomewhat thicker, and the Skin being a little diſtended about the Wound, I was obliged to divide the laſt mentioned Stitch, to admit of the free Diſcharge of the *Pus*, which on the two ſucceeding Days became much thicker than before, and the *Gleet* conſequently leſſened.

About this Time the two Ends of the *Tendon* were not a little dilated, and a white Slough appeared on it toward the upper Part of the Wound; on which, inſtead of the *Balſam* of *Turpentine*, I applied *Tincture* of *Myrrh*. Not many Days after, this Slough came off, and the two Ends of the *Tendon* were overſpread with a *fungous* Fleſh; by which I was aſſured, that its Blood-Veſſels and nutritive Tubes were not compreſſed by the two firſt Ligatures. Afterwards I made uſe of drier Applications than before; ſometimes uſing Lint only, and at other Times *Pulvis Terebinthinæ*. About 10 Days after the Operation, I found one of the two Ligatures in the *Tendon* hanging looſe, which I divided and drew out. Two or 3 Days after, I found the other Ligature looſe alſo, which in like manner I removed, the Part all this while being kept inflected by the Paſt-board above-mentioned.

I was often obliged to apply gentle *Eſcharoticks*, to leſſen the *Fungus* on the *Tendon*. In leſs than 30 Days after the Operation, he went abroad very lamely. And not many Days after, he told me he had walked round St. *James*'s-*Park*; on the 26th of *March* following (which was within 8 Weeks after the Operation) he walked from his Habitation in *Witch-ſtreet*, without *Temple-bar*, to *Greenwich*, and returned in a few Hours. He has ſince recovered all the *Motions* of his *Foot*, and ſhews very little Lameneſs in Walking, and is not in the leaſt incommoded at his Trade.

It is a common Opinion, that *ſtitching* divided *Tendons* is hazardous, if not impracticable; and though the Authority of ſome *Writers* would have prevailed with me, in ſome meaſure, to have an Opinion of the Succeſs of ſuch an Attempt, yet the Contradictions of others, of no leſs Note, would have left me dubious, had I not ſome Time ſince ſeen large *Blood-Veſſels* in the *Tendon* of a Horſe's Leg; which at that Time convinced me, that *Tendons* as well as *Bones*, and other Parts, would *unite*, though they were quite divided, in caſe the neighbouring Parts remain intire, if their two Extreams could be artificially applied to each other, without compreſſing all, or the greateſt Part of their *Blood-Veſſels*. This Diſtribution of the *Blood-Veſſels* is expreſſed in the annexed *Figure*, where one Trunk A, A, with its Branches *a*, *a*, to the *Fibrilla* of the *Tendon* B, B, is expreſſed: Whether it was a *Vein* or an *Artery*, I could not diſcover in that Subject, but in all Probability, both thoſe Veſſels have the like Diſpoſition in ſuch large *Tendons*. I am inclined to think the like Diſtribution of *Blood-Veſſels* is not to be found in the *Tendon* which was divided in this preſent Inſtance; but that its *Blood-Veſſels* paſs into it and back again at its internal Side, next the *Muſcles* of the *Toes* and *Fig.* 79.

Tarſus; which ought to be taken Notice of by the Operator in the like Caſe, and that he do not free it of its *Fat* and *Membranes* next thoſe *Muſcles*, leſt its Communication with the *Blood-Veſſels* be deſtroyed.

VI. *Accounts and Emendations of Books* omitted.

n. 194. p. 544. 1. *Oſteologia Nova*; or ſome Obſervations of the *Bones*, &c. by *Clopton Havers*, M. D. *Lond.* 1691, in 8*vo.*

Ph. Col. n. 2. p. 22. 2. De Ratione *Motus Muſculorum*; by Dr. *C.* An. 1664. *The Author here farther explains his* Hypotheſis, *and obviates ſome Objections to it.*

n. 10. p. 176. 3. *Nic. Stenonis* de *Muſculis* & *Glandulis* Obſervationum Specimen; cum duabus Epiſtolis Anatomicis.

n. 27. p. 512. 4. Elementorum *Myologiæ* Specimen; ſeu *Muſculi* Deſcriptio Geometrica.
n. 32. p. 627. Auth. *Nicolao Stenone. Florentiæ*, 1667, in 4*to.*

n. 213. p. 226. 5. *Myotomia Reformata*; or a new Adminiſtration of all the *Muſcles* of human Bodies; wherein the true *Uſes* of the *Muſcles* are explained; the Error of former Anatomiſts concerning them confuted; and ſeveral *Muſcles* not hitherto taken Notice of deſcribed. To which are ſubjoined a graphical Deſcription of the *Bones* and other anatomical Obſervations illuſtrated with Figures after the Life. By *Will. Cowper*, Surgeon. *Lond.* 1694, in 8*vo.*

n. 251. p. 130. 6. An Account of 5 Pair of *Muſcles*, which ſerve for different *Motions* of the *Head*, on the firſt and ſecond *Vertebræ* of the *Neck*; and of two *Ligaments*, one of which faſtens the *Head* to the firſt *Vertebra*, the other faſtens the firſt to the ſecond. To which is annexed the Hiſtory of an uncommon Appearance of a *human Skull.* By M. *Dupré. But Mr.* Will. Cowper *here ſhews, that the Diſcovery of theſe* Muſcles *is not* new; *moſt, if not all, of them being either deſcribed by him in his* Myotomia Reformata *and other Anatomiſts, or only the different Appearances of known Muſcles in* particular Subjects: *To which he adds* 2 *exact Figures of the ſame* Bones *and* Muſcles, *done after the* Life.

n. 42. p. 833. 7. Tractatus 5 Phyſico-Medici, de *Sale-Nitro* & *Spiritu Nitro Aereo*, &c.
n. 105. p. 101. de *Motu Muſculari, & Spiritibus Animalibus*; de *Rachitide:* Auth. *Joh. Mayow*, L. L. D. *Oxon*, 1674, in 8*vo.*

n. 148. p. 222. 8. *Wilhelmi ten Ryne*, M. D. *&c. Tranſiſilano-Daventrienſis*, 1. Diſſertatio de *Arthritide*. 2. Mantiſſa Schematica. 3. De *Acupunctura*. 4. Orationes tres ſc. de *Chymiæ* & *Botanicæ* Antiquitate & Dignitate; De *Phyſiognomia*; De *Monſtris*. *Lond.* 1683, in 8*vo.*

n. 125. p. 621. 9. Two Treatiſes; the one medical, of the *Gout*; by *Herman Buſchof* Senior, of *Utrecht*. The other partly chirurgical, partly medical, containing ſome Obſervations and Practices relating to ſome extraordinary Caſes of Diſeaſes in both Sexes; by *Hen. van Roonhuyſe*. *Engliſhed* out of *Dutch*. *Lond.* 1676, in 8*vo.*

C H A P. VII.

Monſters.

I. IN the Houſe of M. *Bourdelot* was ſhewed a *Monſter* in Form of an *Ape*, having all over its Shoulders, almoſt to his Middle, a *Maſs* of *Fleſh* that came from the hinder Part of its Head, and hung down in Form of a little *Cloak*. The Report is, that the Woman which brought it forth had ſeen on the Stage an *Ape* ſo cloathed: The moſt remarkable Thing was, that the ſaid *Maſs* of *Fleſh* was divided in four Parts, correſpondent to the Coat the *Ape* did carry. The Woman, upon Enquiry, was found to have gone 5 Months with Child, before ſhe had met with the Accident of that unhappy Sight.

A monſtrous *Birth like a* Monkey, *at* Paris; *by* M—— *n.* 26. *p.* 479.

II. I have lately lighted upon a *monſtrous Birth*, viz. *Twin-Females*, very handſome, but ſo faſtened together by the *Breaſt*, that there was diſcerned but one only Trunk of the Body; which having their Chin united together, ſeemed to kiſs one another. I opened them at the *Navel*, which was common to them both, and found that there was but *one Heart*, though greater and rounder than ordinary; ſo that Nature ſeemed to have united the Matter of two into one. They had *two Lungs* and *one Stomach*, the *Pylorus* of which did ſtrangely branch itſelf into two Ranks in the Bowels. There was but *one Liver*, but big; for the reſt, there were *two Spleens*, *four Kindneys*, *two Wombs* full of a white Matter, like a concreted Semen, and *two Vulva's* with their diſtinct *Hymens*.

Twins faſtned *together at the* Breaſt; *by S.* Jac. Grandi. *n.* 58. *p.* 1188.

III. *Octob.* 22, 1679, One *Grace Batterd*, of *Plymouth*, of honeſt Repute, and Mother of 5 Children, about 12 o'Clock at Night began to have Travailing Pains; and near 4 o'Clock in the Morning the Head of a Child came to the Birth: When the Midwife, putting her Hand to help off this, felt another, by its Heat and Motion alive. This Birth had *two Heads* and *two Necks*, as alſo the *Eyes*, *Mouths* and *Ears*, ſuitably *double*; *four Arms*, with *Hands*, and as many *Legs* and *Feet*. There was to both but *one Trunk*; but *two Back-bones*, from the *Clavicles* to the *Hypogaſtrium*, and from the Shoulders down to the Bottom of the Loins they were not diſtinct, but cemented and *concorporated*, after this Manner: The Right *Clavicle* or Channel-Bone of the Right-hand Child (being long) joined with the Left *Clavicle* of the Left-hand Child. The *Ribs* on the Face-ſide of both of them, by the *Cartilages* or Griſtles were *united* without any intervening *Sternum* or *Breaſt-bone*; and ſo made a common *Cheſt* to them both: And the *Ribs* of both on the Back-part were *united* by the *Griſtles*; and from the *Clavicle* down to the *Hypogaſtrium*, or Bottom of the Belly they were ſo *conjoined*, that they made but one common Belly with one *Navel-String* to them both; but from the *Hypogaſtrium* downwards they were

Twins faſtned *together at the* Breaſt; *by Dr.* Will. Durſton. *n.* 65. *p.* 2096.

divided, and became *two*, each having the perfect Parts of *Females*. They were exactly like one another; very well featured, having alſo pretty neat and handſome Limbs. They had their Hair more than ordinarily thick, and about half an Inch long, and the Nails full grown. The Weight of this Birth was $8\frac{1}{4}$ *Pounds*; the Circumference of the Left Head was about 11 *Inches*, that of the Right being half an *Inch* leſs. The Circumference of the Trunk was about 16 *Inches* and $\frac{1}{4}$; and the Length of both, from Head to Foot, was full 18 *Inches* and an half.

We found on Diſſection *one Navel-Vein*, and *one Liver*, but that was very large, with the *Bladder* of *Gall* ſeated in its uſual Place: But there were *two Urinary Bladders*, *two Wombs*, *four Kidneys*, and *one Stomach*, with the *Oeſophagus* or Gullet perforate and open from the Mouth of the Left Head; but the *Oeſophagus* from the Mouth of the Right Head deſcended no lower than a little above *half* an *Inch* of the *Midriff*, and there it ended. Whence it may be concluded, that the Right-hand Child muſt have received its Nouriſhment by and from the Left Child. There was but *one Colon* which terminated into two *Inteſtina Recta*. So there was but *one Midriff*, and above that, we could find little or no Appearance of *Lungs*; but only a very large *Heart* (with two *Auricles*) the Figure of which was not Conical, but like a Soldier's *Pera* or Snapſack, or the *Ventricle* or Stomach; and lying near under the *Clavicles* tranſverſe, as the Stomach lieth under the *Midriff* and *Liver*. We did alſo obſerve *two Ventricles* with the *tricuſpid* or *ſigmoid Valves*; as alſo the *Vena Cava* and *Aorta* dependant, and alſo the *Aorta* aſcending and bifurcate towards each Neck, and then bifurcate again.

The Mother is in as good a Condition of Health as Women in Child-bed uſed to be.

A Twin Female Infant united *below the* Diaphragm; *by Dr.* S.Morris. *n.* 138. *p.*961.

IV. At *Petworth* in *Suſſex*, *Decemb.* 20, 1677, one *Joan Peto*, a Butcher's Wife, after moſt acute Pains, was, by her Midwife, delivered of a *Monſtrous Female-Birth*. It had *two Heads*: Both the Faces very well ſhaped. The Left Face looked Swarthy, and never breathed; and the Left Head was the bigger, and ſtayed longer in the Bearing. The Right Head was perceived to *breath*, but not heard to *cry*. Betwixt the Heads was a Protuberance like another Shoulder. The Breaſt (and *Clavicles*) very large; about 7 *Inches* broad: But *two Hands*, and but *two Feet*.

The *Brain* in each Head was very large. The *Spina Dorſi*, from the Neck to the Loins, was *double*. There were alſo *two Hearts*, one on each ſide the *Thorax*: The Left Heart the bigger: And *two Pair* of *Lungs*, one infolding each Heart. Thoſe in the Left-ſide were blackiſh; the other looked well. The *Mediaſtinum* parted the *two Hearts* one from the other. The *Aorta* and *Vena Cava*, below the *Diaphragm*, *ſingle*; the *Diaphragm* having only three Perforations, as is uſual. But a little above it they were each *divided* into two Branches, diſtributed to the *two Hearts* in the Figure of a *Greek* Y. The *Oeſophagus*, in like Manner, a little above the *Diaphragm*, *ſcil.* about the *Fifth Vertebra*, was *divided* into two Branches, one aſcending up into each Throat. There were alſo *two Stomachs* or *Ventriculi*; one ſhaped as in natural Birth: The other, a kind of great Bag, bigger than the natural Ventricle. In which Reſpect it anſwered to the Paunch in a Cow or Sheep: But, in regard of its Place, rather to the *Reticulus*, or elſe to the *Abomaſum*; being at the one Orifice continuous with the true *Pylorus*, and at the other with the *Duodenum*. Within it was contained a Subſtance like *Meconium*, as is uſual in Children newly born. The *Liver* but one, but very great; and the *Cyſtis Fellea* proportionable. The *Spleen* alſo *one*, but large. So were the *Inteſtines*, and all the Parts of the *lower Ventricle*, eſpecially the Left *Kidney*. The *Uterus* of an uſual Bigneſs; but the *Clitoris* large.

The *Secundine* extraordinary great, weighing about 8 *Pounds*.

A double Birth joined *at the* Breaſt, *in* Somerſetſhire; *by Mr.* A. P. *Ph.Col. n. 2. p. 21.*

V. I have ſeen a *ſtrange Birth* at *Hilbrewers* in *Somerſetſhire*. There are two Things which ſeem to me probable. 1. That Nature deſigned and made Preparation for *Twins*. For, the *Joining* of theſe two infant Bodies beginning at the Navel, each hath all its Parts below, to the very Toes, proper to itſelf, and not only *diſtinct* all along, but *ſeparate*. Upwards, beneath the *Breaſts*, theſe Bodies part again, and then all is, as below, *diſtinct* and *ſeparate*. When laid *ſupine*, they ſeem to have but *one Body* where joined; but when *turned*, there is a deep Furrow between both, each hath a *diſtinct Spina Dorſi*, &c. each hath *Nipples* in their proper Place reſpecting the ſeveral Bodies, but one of each is ſeen before, the other behind, reſpecting the whole: They do not *wake* and *ſleep* together certainly; they *ſuck* and *cry* heartily, *exonerate* apart freely, and are likely to *live*, if the Multitudes that come to ſee them (ſometimes 500 in a Day) do not occaſion the ſhortning of their Lives. They are *chriſtened* by the Names of *Aquila* and *Priſcilla*, though both *Females*. They were born by an eaſy Travail to the Mother (who had been 2 Years infirm) on the 19th of *May*, 1681. She had had 5 Children before. 2. The other Thing I obſerve as credible is, That this Accident might happen in ſome ſuch Way as this; Near the Time of the firſt Formation of the *Fœtus*, the *Navel-Strings* of each chanced to be ſo *joined*, that all along, from within the Bodies of the Children to the End terminating in the *Womb*, they might ſeem as *one*. The *Midwife* ſaid, the *After-burthen*, though but *one*, was tripple in Bigneſs to what is uſual; that the *Navel-String* was very great, ſo that it is eaſy to conceive, there might be diſtinct, though joined *umbilical Veſſels*, which, in Likelihood, parted within that common *Navel*, whence each Body had a juſt Diſtribution of its proper Veſſels. There was ſuch a Crowd of People there, that I could not give myſelf that Satisfaction I deſired, yet I thought it worth my Pains to ſee and underſtand thus much of this unuſual Accident. One in an adjoining Pariſh told us, That an ancient Man living there remembred his Wife (now dead) had, about 40 Years ſince, ſeen ſuch a Thing in *Wales*, and that the Children lived ſo long as to be able to talk to one another, and that in Tears, when the one thought what the other ſhould do when either ſhould happen to die; and that both died together.

VI. There

Two monſtrous Births in Scotland; *by Dr.* Geo. Garden. *n.*175.*p.*1156.

VI. There have been two *monſtrous Births* this Year at *Aberdeen*, both *Females:* The firſt was two perfectly formed Children above and below the Belly, having *two Heads*, *four Arms*, and *four Legs*, only the two Arms which ſtood next the other, were not perfectly formed into *Hands* and *Fingers*, the *Breaſts* beginning to *join* thereabouts. There was but *one Belly*, though ſomewhat bigger than ordinary, *one Navel* and *Navel-ſtring*, tied to *one After-birth*; yet there were *four Buttocks*, *two* diſtinct *Fundaments*, and the *two Privities* were confounded together. It is thought they might have been brought forth alive, but that they ſtaid ſo long in the Birth; for that both Heads preſenting together, the Midwife thought they had been *Twins*, and thruſt one of them always back.

The other had all the due Proportions of one Child, the *Head* excepted; it having *two Heads*, the one ſtanding behind the other, the foremoſt leſs than the due Proportion, and bowed down upon the Breaſt, having yellow Hair, and wanting nothing of the due Proportions of the Face ſave one Cheek beneath the Eye; the other bigger than ordinary, ſtanding ſomewhat higher, having no Face, which they ſuppoſed to have been disfigured by the back part of the foremoſt.

A monſtrous *Boy*; *by* S. Jac. Grandi. *n.*58.*p.* 1189.

VII. I have lighted upon a *monſtrous* Boy, terrible to behold, born with his *Breaſt* open, the *Bowels* out of the Belly, the *Legs* diſtorted, the *Bladder* in the Place of the *Fundament:* In the *Genitals*, beſides that the *Teſticuli* were cloſe to the *Kidneys*, there was nothing but a *membranous Expanſion* wherein the *ſpermatick Veſſels* were loſt.

A monſtrous *Child*; *by M.* Chr. Krahe. *n.* 160.*p.* 599.

Fig. 80.

VIII. *Feb.* 29, 1684, at a Village called *Heiſagger*, near *Hatterſleben* in *South Jutland*, a Soldier's Wife was delivered of this *monſtrous* Child: It is ſuppoſed ſhe had ſeen ſome Body wounded or disfigured in the ſame Manner, as it doth appear at the Child's Leg or Foot. At the Left Leg, 1. There was to be ſeen an oblong round Piece of Fleſh of a brown and blue Colour, at the Extremities ſomewhat ſharpened, which was joined to the Calf of the Leg 2, and could be moved or put out in from 1 to 3, that other Piece of Fleſh 4, was of the ſame Colour, but faſtened to the Leg, ſo that it could not be diſplaced. At the right Foot it hath 6 Toes; 7, was like a Bullet of a Piſtol, which did hang looſely to the Leg; 8, another Bullet ſomewhat bigger. The Face did look pretty old, as it had been of 35 or 40 Years of Age. 5 and 6, at the Fore-heard there had been obſerved ſuch *Excreſcencies* as if it were *artificial Laces:* Which the Painter, who 3 Days after it was dead, did draw the Scheme, teſtifieth to have been almoſt ſpoiled or rotten by the touching of ſo many Hundreds of People that went to ſee this Creature. But before, when the Head of the Child was turned againſt the Light of the Sun, theſe phyſical *Laces* ſeemed to be very artificially done. With the *Left Eye* it did look fiercely, keeping the other cloſe. Behind the *Head*, there was a Shape like a *Hood*, or other Ornament, which Women commonly do wear. His *Arm* was figured like as the Scheme ſheweth, with ſeveral Knots or Joints. The *Tail*, which was ſtrangely grown out of the back Part, 9, was a quarter of a *Zealandiſh Ell* long. The Mother of this Child being aged about 40 Years, hath had formerly two other Sons, now of 7 and 9 Years of Age, which are well ſhaped, and ſtill alive: But this *Monſter*, after it had *cried* out two or three times, died preſently.

An Hermaphrodite *at* London; *by* *Dr.*Thomas Allen. *n.* 32. *p.* 624.

IX. The Name of this *Hermaphrodite*, is *Anne Wild*, born in the Month of *February*, at the *Feaſt* of the *Purification*, in the *Year* of our *Lord* 1647, in a conſiderable Village of *Hampſhire*, commonly called *Ringwood*. When ſhe was about ſix Years of Age, after jumping and wreſtling with ſome Boys of her own Age (a great deal weaker than ſhe) there began firſt to appear two Protuberances, like the *Herniæ* called *Bubonoceles*, to reduce which (for that was their Intention) the Surgeons attempted for a long while in vain. For they happened to be little *Teſticles*, which being now become larger, and included in a *Scrotum*, wrinkled and ſet round with *Hair*, are not to be diſtinguiſhed from the Male *Teſticles* in a natural State, except that each of them has a proper *Scrotum* of its own, as it were, but at the ſame Time ſo long as from the Production of the two to form the *Labia Pudendorum*. Within theſe Lips the *Nymphæ* and *Carunculæ Myrtiformes* appear well enough formed; and the Middle Part of the *Vulva*, is covered with a thin Membrane reaching upwards from the *Perinæum*. The *Clitoris* does not appear. The *Womb* with its *Neck* differs in nothing from that in other Women. Till ſhe was thirteen Years old, it was not doubted that ſhe was a Female, ſhe wore a Woman's Garb, and did the ſame Work as Women commonly do. But happening accidentally to work hard at Baking of Bread, immediately a *Penis*, which had lain hid till that Time, broke forcibly out, to her no ſmall Surpriſe. The *Penis*, when it is erected, is four Inches long; it is ſituated the very ſame as the *Penis* in Men commonly is, and ends in a *Glans*, covered with a *Prepuce*, with a *Frænum* connecting them together, the ſame as in Men. But the *Glans* being imperforated (in ſuch a Manner however, as you would think the thin Membrane that cloſes its Orifice might eaſily be pierced) denies a Paſſage for the *Semen* out of the *Urethra*, whence (flowing back perhaps) it is ejected by the Orifice of the *Vagina*.

When ſhe was ſeventeen, the *Menſtrua* began to flow periodically and in the uſual Quantity, and ſo continued to do for the Space of two Years. After which, theſe diſappearing, the *Beard* began to ſprout out, and from that Time her whole Body has been hairy, and the *Voice* and *Make* of the Body are both become maſculine. The *Hair* is like that of a *Man*; ſhe has no *Breaſts*; the *Nipples* are very ſmall; the *Cheſt* broad; the *Haunches* narrow; the *Hips* more contracted than is common in *Women*.

She ſays ſhe is provided for either Sex, but rather chuſes to have to do with *Women*; whom when ſhe ſees and luſts after, the *Penis* is erected; which whenever ſhe longs for a *Man*, remains *flaccid*. I ſhall only add one Thing more, which I think is well worth mentioning, *viz.* That one Night, happening to paſs the Evening with ſome merry Companions, in Drinking, and Dancing, and Games that raiſe Concupiſcence, happening to caſt her Eyes upon a handſome young *Man*, ſhe immediately conceived ſuch a violent Paſſion for him, that the next Day ſhe was ſeized with an *Hyſterick Fit*, as appeared not only from the *Riſing* of the *Matrix*, her *Singing*, *Laughing*, *Crying*, and other *Symptoms* of that Diſorder, but likewiſe from the *Cure*; for by giving her *Hyſterick* Medicines and applying a *Plaiſter of Galbanum* to the Parts about the Navel, the Symptoms went off, and ſhe ſoon recovered.

An Hermaphrodite *at* Tholouſe; *by M.* Veay. *n.* 168. *p.* 282.

X. *Nov.* 1686, there was brought into the Hoſpital of *S. Jacques* a Servant that was ill, an *Hermaphrodite*. She had been baptized as a Woman, by the Name of *Margaret*. Her Father was a poor Man of *Pourdiac*, ſeven Leagues from *Tholouſe*, his Name was *Malauſe*. Her *Age* is one and Twenty, and ſhe has the external Appearance of a *Woman*, but the real Marks of a *Man* appearing very ſtrong. Her *Face* is like that of a *Woman*, and agreeable enough, the *Neck* very fine, the *Breaſts* as well formed as you can deſire in a *Woman*, the Hips and Thighs large as in a *Woman*, the *Pudenda* every Way like thoſe of a *Woman*, only the *Vagina* is no more than two Inches long; and from the Middle of the *Slit* there hangs down a *Penis*, of a conſiderable Thickneſs, and in an Erection it ſtands out about eight Inches. This *Penis* is well formed, except that it has no *Prepuce*, and has no *Teſticles* accompanying it. The *Urine* and *Semen* are voided by it as in Men, and, which is very particular, the *Menſtrua* are diſcharged by the ſame Paſſage.

I ſhould ſcarce have believed this, if I had not ſeen it myſelf, and examined it very exactly during the Time that the *Menſtrua* flowed, which happens very regularly for the moſt Part every Month, hardly ever paſſing two Months together without them; but almoſt always accompanied with great Pain, and a Tenſion of the Lower-Belly, which indicates a Kind of Inflammation in thoſe Parts.

I have got ſeveral of our Phyſicians to ſee this *Hermaphrodite*, and after having conſulted the *Vicars-General* about it, we have made her put on Mens Cloaths, and take the Name of *Arnaud Malauſe*, and they are deſigned very ſoon to put her to ſome Trade. There was no manner of Occaſion for being ſcrupulous about this, becauſe the *Hermaphrodite* can very well perform the Function of a *Man*, and not at all that of a *Woman*.

CHAP. VIII.

The Period of Human Life.

An anatomical Account of Tho. Parre; *by Dr.* Harvey. *n.* 44. *p.* 886.

I. THomas Parre* was a poor Countryman of *Shropſhire*, whence he was brought up to *London* by *Thomas* Earl of *Arundel* and *Surrey*, and died at the Age of 152 *Years* and 9 *Months*. Being opened after his Death (*Nov.* 16, 1635) his Body was found yet very fleſhy; his Breaſt hairy;

his Genitals unimpaired, ſerving not a little to confirm the Report of his having undergone publick Cenſures of his *Incontinency*, eſpecially ſeeing that after that Time, *viz.* at the Age of 120 Years, he married a Widow who owned, *Eum cum ipſa rem habuiſſe, ut alii Mariti ſolent, & uſque ad* 12 *Annos retroactos Solitum cum ea Congreſſum frequentaſſe.* Further, he had a large Breaſt, *Lungs* not fungous but ſticking to his Ribs, and diſtended with much Blood; a Lividneſs in his Face, as he had a *Difficulty* of Breathing a little before his Death, and a long-laſting *Warmth* in his Arm-pits and Breaſt after it (which Sign, together with others, were ſo evident in his Body, as they uſe to be in thoſe that die by *Suffocation.*) His *Heart* was great, thick, fibrous and fat. The *Blood* in the *Heart* blackiſh and dilute. The Cartilages of the *Sternum* not more *bony* than in others, but *flexile* and ſoft. His *Viſcera* very ſound and ſtrong, eſpecially the *Stomach*; and it was obſerved of him that he uſed to eat often by Night and Day, though contented with old Cheeſe, Milk, coarſe Bread, Small Beer, and Whey, and, which is more remarkable, that he did eat at Midnight a little before he died. His *Kidneys* were covered with *Fat*, and pretty ſound; only in the anterior Surface of them there were found ſome aqueous or ſerous (as it were) *Abſceſſes*, whereof one was near the Bigneſs of a Hen-Egg, with a yellowiſh Water in it, having made a roundiſh Cavity, impreſſed in that *Kidney*: Whence ſome thought it came, that a little before his Death a *Suppreſſion* of *Urine* had befallen him, though others were of Opinion, that his *Urine* was *ſuppreſſed* upon the Regurgitation of all the Seroſity into the *Lungs*. Not the leaſt Appearance there was of any *ſtony* Matter, either in the *Kidneys* or *Bladder*. His *Bowels* were alſo ſound, a little whitiſh without. His *Spleen* very little, hardly equalling the Bigneſs of one *Kidney*. His *Brain* was entire and firm; and though he had not the Uſe of his *Eyes*, nor much of his *Memory*, ſeveral Years before he died, yet he had his *Hearing* and *Apprehenſion* very well, and was able, even to the 130th Year of his *Age*, to do any Huſband-man's Work, even Threſhing of Corn.

In ſhort, all his *inward Parts* appeared ſo healthy, that if he had not changed his Diet and Air, he might perhaps have lived a good while longer. But coming out of a clear, thin and free Air, into the thick Air of *London*, and after a conſtant, plain and homely Country Diet, being taken into a ſplendid Family, where he fed high, and drank plentifully of the beſt Wines; whereupon the natural Functions of the Parts of his Body were overcharged, his *Lungs* obſtructed, and the Habit of the whole Body quite diſordered; upon which there could not but ſoon enſue a *Diſſolution*.

The great Age of Henry Jenkins; *by Mrs.* Anne Savile. *n.* 221. *p.* 266.

II. 1. When I came firſt to live at *Bolton*, I was told ſeveral Particulars of the great *Age* of *Henry Jenkins*, but I believed little of the Story for many Years, till one Day coming to beg an Alms, I deſired him to tell me truly how old he was. He pauſed a little, and then ſaid, that to the beſt of his Remembrance he was about 162 or 3; and I aſked, What Kings he remembred, he ſaid *Henry* VIII. I aſked, what *publick Thing* he could longeſt remember? He ſaid, *Plowden-field*. I aſked, whether the King was there, he ſaid no, he was in *France*, and the Earl of *Surrey* was General. I aſked him how old he might be then? He ſaid, I believe I might be between 10 and 12; for, ſays he, I was ſent to *Northallerton* with a Horſe-Load of Arrows, but they ſent a bigger Boy from thence to the Army with them. All this agreed with the Hiſtory of that Time; for Bows and Arrows were then uſed, the *Earl* he named was *General*, and King *Henry* VIII. was then at *Tournay*: And yet it is obſervable, that this *Jenkins* could neither write nor read. There were alſo 4 or 5 in the ſame Pariſh that were reputed all of them to be 100 Years old, or within 2 or 3 Years of it, and they all ſaid he was an elderly Man ever ſince they knew him; for he was born in another Pariſh, and before any Regiſters were in Churches, as it is ſaid: He told me then too, that he was Butler to the Lord *Conyers*, and remembred the Abbot of *Fountains-Abbey* very well, before the *Diſſolution* of the *Monaſteries*.

By Dr. Tancred Robinſon. *Ib. p.* 267.

2. *Henry Jenkins* departed this Life *Dec.* 8, 1670, at *Ellerton* upon *Swale* in *Yorkſhire*; the Battle of *Flowden-field* was fought *Sept.* 9, 1513, and he was about 12 Years old when *Flowden-field* was fought. So that this *Henry Jenkins* lived 169 Years, *viz.* 16 longer than Old *Parre*, and was the oldeſt Man born upon the Ruins of this Poſtdiluvian World.

In the laſt Century of his Life he was a *Fiſherman*, and uſed to wade in the Streams; his Diet was coarſe and ſoure; but towards the latter End of his Days he begged up and down. He hath ſworn in *Chancery*, and other *Courts*, to above 140 Years Memory, and was often at the *Aſſizes* at *York*, whither he generally went on Foot: And I have heard ſome of the Country Gentlemen affirm, that he frequently ſwam in the Rivers after he was paſt the Age of 100 Years.

By Mr. Hill. *n.*228. *p.* 543.

3. In the *King's Remembrancer's Office* in the *Exchequer*, is a Record of a Depoſition in a Cauſe by *Engliſh* Bill, between *Ant. Clark* and *Smirkſon*, taken *April* 1665, at *Kettering* in *Yorkſhire*, where *Henry Jenkins* of *Ellerton* upon *Swale*, Labourer, aged 157 Years, was produced, and depoſed as a Witneſs. Divers very ancient Witneſſes ſwore him to be a very old Man when they firſt knew him.

Several very aged Perſons in the North *of* England; *by Dr.* Mart. Liſter. *n.*160. *p.* 597.

III. 1. *Rob. Montgomery* now (in the Year 1670) living at *Skipton* in *Craven*, but born in *Scotland*, tells me that he is 126 Years of Age; the oldeſt in *Skipton* ſay, that they never knew him other than an old Man; he is exceedingly decayed of late, but yet he goes about a Begging.

2. *Mary Alliſon* of *Thorlby*, in the Pariſh of *Skipton*, died in 1668, aged about 108. She ſpun a Web of Linnen-Cloth a Year or two before ſhe died.

3. *J. Sagar* of *Burnley* in *Lancaſhire*, about 10 Miles off *Skipton*, died about the Year 1668, and was of the Age (as is reported) of 112.

4. *Tho. Wiggin* of *Carlton* in *Craven* died in 1670, at the Age of 108, and odd Months: He went about till within few Weeks of his laſt, and was a very fair Corpſe.

5, 6. *Frances Woodworth* of *Carlton* died in 1662, of the Age of 102, and ſome odd *Months*; the Mother of 7 Children, always a very lean Woman, yet to her very laſt went about as ſtreight and upright as a young Girl, and of perfect Memory: Her *Sight* and *Hearing* decayed, though not wholly deprived of either. This by Information from her Son *Robert Woodworth*, now (in 1670) living in *Carlton*, of the Age of 69, as able a Man to ditch and plough as any in the Town.

7, 8. *Will. Garthorp* and *Will. Baxter* of *Carlton* inform me, that they two being upon the Jury at *York* in 1664, they ſaw and ſpake with, in the *Aſſize-Hall*, two Men, *Father* and *Son* ſummoned as Witneſſes in ſome Cauſe or other out of *Dent*, a ſmall Village in *Craven*, 8 Miles beyond *Settle*. The *Father* told them, that he and his *Son* made 12 Score between them, and that his Son was above 100, and that he wanted not half a Year of 140. He told them further, that he could and did make *Fiſh-hooks* as ſmall as would take a Trout with a ſingle Hair. They obſerved that the *Son* looked much older, and had the whiter Hair. N. B. It is to be obſerved that the *Food* of all this *mountainous Country* is exceeding coarſe, as ſalted and dried Beef, and ſoure leavened Oat-bread. I am confident many Scores of Perſons might be found of the Age of 100 Years among theſe *Northern Mountains*.

IV. 1. My Lord *Bacon* ſays, that the *Counteſs* of *Deſmond* in *Ireland* was 140 Years of Age.

2. Mrs. *Eckleſton*, who lived at *Philipſtown* in the *King's County*, was born in the Year 1548, and died 1691; ſo ſhe was 143 *Years* old.

The great Age of two Perſons in Ireland; *by Dr.* Tho. Molineux. *n.* 261. *p.* 502.

V. After I had often reflected upon the general Cauſes of Diſeaſes that lead to *Death*, I mean thoſe of the *Debilitation* of *Nature's Strength* in the Courſe of Man's Life, until its utter Extinction, and of the Cauſes of a meerly *natural Death*, by the Failure of that Strength in an extreme *decrepit Age*, without the Concurrence of any Exceſs or external Cauſe; I have entertained ſome Conjecture, that if we were more intelligent in this Matter than we are, we might procure for ourſelves an *Age* of *continual Youth*; ſetting aſide the ſeveral Accidents of *divine Providence*, and meerly conſidering the *Forces* of *Nature*, not only not hindered, but alſo aſſiſted as much as may be.

Longævity, *and the Cauſes of* natural Death; *by M. de* Martel. *n.* 58. *p.* 1179.

Searching therefore for the true Cauſes of *Old Age*, and of *natural Death*, I was not ſatisfied with that *Extinction* of *natural Heat* and *Deſiccation* of the *radical Humour*, aſſigned to be the Cauſe thereof, nor with the Cauſes of this *Extinction* and *Deſiccation* that are commonly alledged, it being ſuppoſed that this *hot* and *moiſt* Principle of Life, in its own Nature diſſipable in the Courſe of Life, not being perfectly repaired by Food, is conſiderably diminiſhed, which brings *Old Age*, and is at laſt quite conſumed, which cauſeth *natural Death*; where Authors make a great Difference between the *ſeminal Heat* and the *Moiſture*, and that which comes from *Aliments*; ſo that, *ſay they*, the former cannot be repaired by the latter, as being heterogeneous. Which to me ſeems not to be true; for doth not this *ſeminal Heat* and *Moiſture* originally proceed from what is ſuperfluous of the 3d *Concoction* of the *Aliments?* It is therefore of the ſame Nature; and nothing hinders, but what is diſſipated thereof may be perfectly reſtored by good Nouriſhment, well prepared, and taken ſeaſonably and in due Quantity. Whence it may be juſtly concluded, that the Defect of Repairing this *Principle* of *Life* comes not from its Nature, not reparable this Way, but from ſomething elſe.

The illuſtrious *Bacon* conceived, that this Fault came from the unequal Reparation of the liquid or ſoft, and the dry or more ſolid Parts, which jointly ſerve to maintain and repair themſelves: Whence it comes to paſs, that the moſt eaſy to repair, and the moſt neceſſary for Life, as the *Blood*, ceaſe at laſt to be ſufficiently repaired by the Defect of the others, which are not repaired at all. *Sanctorius*, being almoſt of the ſame Sentiment, holds, that *natural Death* happens, becauſe the *Fibres* do ſo dry up, that they can no more be renewed; he making the Maintenance of Life to depend from the Renovation of the Parts. Which doth not ſatisfy me neither, becanſe even the *Bones* themſelves, which are the hardeſt Parts, are capable of Renovation in *old Age*; in regard that *old Oxen*, which we often eat, have at certain Times (I ſay not of the *Moon*, according to the common Opinion) their *Bones* of the ſame Place altogether dry and *Marrowleſs*, and at other Times bedewed with a Subſtance of the Nature of *Marrow*, wherewith they are then filled, which enlargeth their Pores, as of a fine Spunge, and ſoftens them; which then eſpecially comes to paſs, after they have fed upon good Paſture in the Spring.

We muſt therefore enquire into other more true Cauſes of *Old Age* and *Death*, which to me ſeem to be the following. I ſuppoſe, that the *Blood* is the *Principle* of *Life*, as far as it is *vital*, that is, in Motion by the hot Particles contained therein; ſo that thoſe who expire by *Age*, do not die for being deſtitute of *Blood*, which is found abundant and laudable enough in their Veſſels; and which hath been ſufficiently repaired till then; but becauſe it ceaſeth to be *vital*, by reaſon of the too eaſy Diſſipation of the *igneous* Particles, which make it ſuch: Which, in my Opinion, comes to paſs, as it doth in Wine, which evaporates and loſeth its Strength by the Fault of the Veſſel, which by ſome Opening or other gives Paſſage to what gives Virtue to the Wine. The *Tunicles* and *Membranes* of the *Veins* and *Arteries* which encloſe the *Blood*, wear in Time away and wax thin, and their Texture gives and breaks in ſeveral Places; at which Apertures the *igneous* Particles abandon the *Blood*: As in Stuffs and Cloth (whoſe Wool is in a Manner like that of the *Tunicles*) the Threads by wearing do looſen and break, inſomuch that many Holes are made in it as in a Sieve. So that if we had the Art to reinforce and to ſtrengthen anew thoſe *Coats* and *Membranes*, that they might not let ſlip what maketh the *Blood vital*, the *Life* would be preſerved perpetually. For a Proof of which this may ſerve for the preſent, that the *Life* of many dying Perſons is maintained for ſome Time, by making them ſwallow ſome hot and ſpirituous Liquor, as *Spirit* of *Wine* or ſome *Eſſence*, by which the *Blood* is fortified and quickned for ſome Moments: But as this Reinforcement of *Life*, conveyed to the *Heart*,

Heart, and running into the *Veins*, ſoon ſlips out, ſo alſo this new Vigour paſſeth away quickly.

As there is no Reaſon to deſpair of finding out ſuch Medicines, or Aliments, as are proper to ſtrengthen the *Coats* and *Membranes* of the *Veſſels*, ſo as that they may at all Times retain the *fiery* and *ſpirituous* Corpuſcles of the *Blood*, as well as in the Time of *Youth*; we may alſo hope to be enabled to maintain the *Blood* in a Condition always to furniſh alike, as in our vigorous Age, for all the Functions of Life; the Engine of our Body being not unlike to a *Chymiſt*'s *Furnace*, which at firſt well retaining the *Heat*, is very proper for the Operations of Art; but at laſt Chinks and Crevices being made therein, it ceaſes to be ſo, the *Heat* getting away through them, what Fire ſoever you kindle therein.

The **Motions** *of* **Diſeaſes,** *and the Births and Deaths of Animals in different Times of the natural Day; by M.* Paſchal, *n.* 202. *p.* 815.

VI. Having ſome Months ſince entertained a Suſpicion, that the Cauſes of *Tides* at *Sea* do alſo continually exert their Power in other Places, though the Effects thereof may not be ſo ſenſibly perceived on the ſolid as the fluid Parts of the terraqueous Globe, I took this Method to examine it. *Firſt*, I divided the Νυχθήμερον into four *Senaries* of Hours: The *firſt* conſiſted of 3 Hours before the *Southing* of the *Moon* and 3 after; the *ſecond* of the 6 Hours following; and ſo the 3d and 4th, containing the two remaining Quarters of the natural Day. I next betook myſelf to obſerve *Births* and *Deaths*, in our own Kind, as alſo of other Species of Animals, whether they fell out indifferently in any of theſe 4 *Senaries*: And I found none that were *born* or *died* a natural Death in the *firſt* and *third Senaries*, which I take Liberty to call *firſt* and *ſecond Tides*, but every one either in the *ſecond* or *fourth Senaries*, which I call *firſt* and *ſecond Ebbs*. I then proceeded to make Obſervation in the *Motions* of *Diſeaſes*, which I could the better do, becauſe I had ſome in my Family viſited with *Agues*. Here I found that the Tumult of the *Fits* generally laſted all the *Tiding Time*, and then went off in gentle kindly Sweats in the *Ebbs*. I went on then to take Notice of the *Sex res non naturales*, and Alterations of the *Weather*, and ſuch Accounts as I could meet with of Earthquakes and ſundry other Things: And I have yet met nothing to hinder me from laying down this as a Maxim, that *Motion*, *Vigour*, *Action*, *Strength*, &c. appear moſt, and do beſt in the *Tiding Senaries*; and that *Reſt*, *Relaxation*, *Decay*, *Diſſolution*, belong to the *Ebbing Senaries*.

Deaths *at no certain Hours of the* Tide; *by Mr.* Benj. Allen. *n.* 231. *p.* 665.

VII. It is obſerved on our *Sea-Coaſt*, with relation to Mr. *Paſchall*'s Obſervations, That People that are ſick change at the *Turns* of the *Tide* at the Place; ſo as this Notion has obtained among all the *maritime* Towns: *Upland*, with us, it does not conſtantly hold; which may thus be accounted for (if the *Moon*'s Effect be *Fluidity*, as in Froſts is ſeen, a *New Moon* ever thawing, and is agreeable enough to a neighbouring Body of ſo quick a Motion) upon *dry* Land the *Moon* may not have the ſame Force; for I obſerve in Capt. *James*'s Voyage, at *Charleton Iſland* the Fixedneſs of the Winter frozen Air occaſioned the Difference of *Tides* at the *New* and *Full* to be ſcarce greater than the common *neap* ones, whereas *Spring-tides* advanced with the *Summer*. I have obſerved *Agues*, *Tertian* I mean, to come when the *Moon* has come to an Angle, as in one or two exactly when the *Moon* was *ſetting*, and the ſucceeding *Fits* when ſhe *culminated*, the third *Fit* at a *riſing Moon*, and ſo on. *Deaths* I have kept exact Account of, but can find no one Obſervation hold true, ſome at one *Time* of the *Tide*, ſome at another.

VIII. *An Account of a Book* omitted.

n. 14. *p.* 254. King *Solomon*'s Pourtaiture of *Old Age*; by *Jo. Smith*, M. D.

CHAP. IX.

Pharmacy. Chymiſtry.

Three Queries *relating to the* Entalia, Dentalia, Blatta Byzantina, Purpura *and* Buccina *of the* Shops; *by Mr.* Sam. Dale. *n.* 197. *p.* 641. *Anſwered*; *by Dr.* Liſter. *Ib.*

I. WHAT is the *Entalia* of the *Shops*? By what Authors deſcribed? Under what Names? And how they differ from the *Dentalia*?

2. Of what *Shell* is the *Blatta Byzantina* the *Operculum*?

3. There are divers Sorts of *Purpuræ* among Authors, which is that of the *Shops*? Likewiſe which Sort of *Buccina* and *Umbilici Marini* ought to be uſed in the *Shops*?

II. 1. As to the *Entalia*, I do not remember to have ſeen any thing in the *Shops* under that Name. The Deſcriptions of the *Dentalia* in *Schroder* are very faulty, and both thoſe and the *Entalia* by him ſhould ſeem to be the two Species of *Dentalia*, which are by me figured. The *Dentalium* being that which is commonly and in Plenty found about the Iſland of *Garnſey*, and elſewhere upon our Coaſt, and is the ſame with that found in the *Mediterranean*. It is a long, ſlender, round Pipe, a little bending and tapering, hollow and open at both Ends without any Crack or Flaw, naturally white at one End, and uſually a little reddiſh; very ſmooth and poliſhed on the Out-ſide, and from thence, and the Figure, called a *Dog-like Tooth*. The *Entalium*, or other Species of the *Dentalia*, is very much longer and thicker than the former, much like in other Reſpects, ſave that this is ſtreaked with high Ridges, and moſtly of a greeniſh Colour. This Species I gueſs to come from the *Indies*. *Note*, that any thing that is wrought into, or channelled, is in the modern *Italian* called an *Intaglia*; whence I believe, and the Nearneſs of the Word *Dentalia*, aroſe thoſe Diſtinctions of Names.

2. To the *ſecond Query*, I take the *Blatta Byzantina* to have ſucceeded the *Unguis Odoratus*, and to have been brought into the *Shops* in its Place. In *Dioſcorides*'s Time the beſt was brought from the *Red-Sea*, *viz.* the paleſt and fatteſt; the blacker, and leſs, from *Babylon*, or the *Perſian-Gulf*; but it ſeems later Times took up with thoſe found about *Conſtantinople*; whence the preſent *Shop Blatta* had its Name. The Name of *Blatta* is given to this *Operculum*, from the Colour I gueſs; as being of a dark Hair

Colour, as the common *Blatta Piſtinaria*, ſo common in *London*, is; alſo this being a broad, thin, flat Beetle, like the Cover.

It is true, the ſame *Dioſcorides* ſays, the *Unguis* was an *Operculum* (πῶμα κογχυλίον) like to that of the *Purple-Fiſh:* He means what was uſed in his Time; in which it ſeems the *Unguis Odoratus* was loſt, or was not brought to *Europe*. But it will appear out of the ſame *Dioſcorides*, that the *Unguis* was no *Operculum*. It will be worth the while to make out this Miſtake, and conſequently the Error the *Moderns* have been in to ſubſtitute an *Operculum* of a *marine Turben* for the true *Unguis Odoratus*.

Take the Hiſtory of the *Unguis* out of *Dioſcorides*. "It is found, ſays he, "in the Lakes of *India* where *Narde* grows; wherefore the *Conchylia* feed-"ing on *Narde* are *Aromatick*. It is gathered after that the Lakes are dried "up with Summer Heats. He concludes, the *Conchylium* itſelf burned or "calcined, is of the ſame Efficacy with the *Purpura* and *Buccinum* burnt." In the Chapter of *Narde*, he ſays farther, That the *Indian Narde* grew near the River *Ganges*, that is, in certain Lakes, which the Overflowing of that River cauſed. Hence it appears (1.) That the *Unguis Odoratus* was Part of a *Freſh-water Conchylium*. (2.) Now if it was gathered in the *Nardeferus* Lakes upon the River *Ganges*, how comes it to paſs that the ſame was brought out of the *Red-Sea* and *Babylon?* And why ſhould the Shell itſelf be brought, an uſeleſs Luggage, ſo far, as from the River *Ganges* to *Greece*, the *Operculum* rarely being a tenth Part of the Shell itſelf? Now if it was not uſed to be brought and expoſed to Sale, to what Purpoſe was it to declare its *Virtues*, or how could the Experiment be made? I conjecture therefore, that the true *Unguis Odoratus* was ſomething like the half of a *Pectunculus Fluviatilis*, ſo common in the River *Thames*, of the Bigneſs and Thickneſs of my Thumb Nail, and that for theſe Reaſons;

1. That the *Unguis Odoratus* ſeems to have been a *Freſh-water Bivalve* or *Muſcle*, for that they ſtayed till the Lakes on the River *Ganges* were dried up before they gathered them. Now *Bivalves* are ever buried in Sand and Mud, and never riſe up and ſwim about and float as the *Turbinate Snails* do, to which latter only the *Operculum* belongs, and which therefore were always, and eaſily to be caught.

2. He calls this Snail *Conchylium*, and by that general Name diſtinguiſhes it from all the other Sorts, concerning which he treats in ſeveral Chapters; which though in general it take in both Kinds, as well *Turbinate* as *Bivalve*, yet it does more particularly denote a *Concha* or *Bivalve*.

3. The *Onyx* is expreſly reckoned by *Pliny* amongſt the *Bivalves*. For (*l.* 32. *c.* 11.) he makes all theſe Synonymous, *Solen*, ſive *Aulos*, ſive *Donax*, ſive *Onyx*, ſive *Dactylus*. And again more particularly (*Lib.* IX. *c.* 61.) He ſays, *Ex* Concharum *genere ſunt* Dactyli, *ab* Humanorum Unguium *ſimilitudine appellati*. So that in all Probability the *Onyx Odoratus* brought more antiently out of the *Freſh-water Lakes* about *Ganges* in *India*, was not unlike the common *Onyx* of the *Mediterranean*, which was of the *Solen* Kind.

Whatever the *Blatta Byzantia* of our *Shops* is, which has certainly nothing of the Characters of the antient *Aromatick Unguis*, and which in all Probability was loſt upon Account of the difficult Paſſage from *Ganges* into *Europe*, I lament its Loſs, which I have Reaſon to believe was a good Medicine, from its ſtrong *Aromatick* Smell; which is much wanting in our *Teſtacious Powders*, of which this was one of the Number, ſo much uſed, and that not without good Reaſon now-a-days, which are all very flat and inſipid.

To the *Third*, The *Purpura* of the *Antients* is well made out, and figured by *Fabius Columna*: And is one of the moſt common *Murices* of the *Mediterranean Sea*. In this he could not be much miſtaken, becauſe, as I remember, he ſomewhere mentions Heaps of thoſe Shells where *Officinæ Purpuræ* antiently were; and alſo from the *purple* Sanies the Fiſh yields of itſelf. He mentions one or two more Species of *Turbinate Snails*, to be found in the *Mediterranean*, which yields a *purple* Juice. Upon the whole Matter, it is indifferent, what Sort of *Shell* we uſe in the *Shops*, if it be to be *calcined*, provided it be a *Sea-Shell*: Nor do I find either *Dioſcorides* or *Ætius* to have diſtinguiſhed betwixt the *Oſtrea Purpura* or *Buccinum* calcined; but gives them all the ſame *Cauſtick* Virtue. Poſſibly ſome one Species may have it in a higher Degree, as we ſee the various Sorts of *Limeſtone*, if calcined, differ in Strength.

Vid. Vol. I. *Cap.* 6. Sect.

One Thing I ſhall not omit before I end this Paper, becauſe it is now in my Mind, that tho' the Species of *Shell* or *Purpura* be ſcarce known to our *Shops* at this Day, yet the Uſe of the *purple* Juice has been, by Tradition at leaſt, tranſmitted down to our Times, and kept as a Secret even in theſe Iſlands, till Mr. *Cole* got hold of it, and publiſhed it. Sir *Rob. Southwell* told me many Years ago, that his own Mother in *Ireland* was famous for marking Handkerchiefs with the Juice of *Fiſh*; which Mark would never waſh out. And the very learned Mr. *Jo. Beaumont* informs me of a Paſſage in our *Beda*'s *Eccleſiaſtical Hiſtory* relating to the *Purple*, as a known Thing in his Time. The Paſſage is as follows;

Bedæ *Hiſt. Eccleſ. l.* 1. *c.* 1.

Variis Conchyliorum *generibus exceptis: in quibus ſunt* & Muſculæ, *quibus incluſam ſæpe* Margaritam *omnis quidem Coloris optimam inveniunt*; *id eſt*, *& Rubicundi & Purpurei*, *& Hyacinthini & Praſici ſed maxime Candidi. Sunt &* Cochleæ *ſatis ſuperque abundantes*, *quibus Tinctura* Coccinei *Coloris conficitur. Cujus Rubor Pulcherrimus nullo utiquam Solis ardore*, *nulla valet Pluviarum Injuria palleſcere*; *ſed quo* vetuſtior, *eo ſolet eſſe* venuſtior.

You ſee from this Paſſage the *Purple* Trade of *Dying* was uſed in *England*, and very much valued.

Fig. 81.

Fig. 81 repreſents the true *Purpura* of the *Antients*, by the *Italians* called *Gèruſolo*.

Stones *in ſeveral Animals; by Mr.* Will. Clerk. *n.* 250. *p.* 99.

II. *Stones* are not only found in *Human Bodies*, but alſo in ſeveral Part of other Animals, as *Bezoar Stone* found in the Stomach of a kind of *Goa* in both *Indies*; as alſo in the Stomach of *Monkeys* (which is eſteemed th beſt). There is alſo a kind of *Bezoar* called *Cow-Bezoar*, found in th

Stomach of a *Cow*. *Hippalithus* found in the Stomach of *Horſes*; *Ægagropila*, in the *Capra Alpina*, &c.

The Writers of the *Materia Medica* aſcribed great *Virtues* to theſe *Stones*, and particularly the *Bezoar*, and have wrote large Encomiums upon them. But if *Phyſicians* would conſider ſeriouſly the true Worth of them, they would find, that their *Virtue* proceeds more from their being brought from a *foreign* Country, and a common Vogue and Eſteem they have got in the World, than from any *intrinſick Virtue* they have in the *Cures* of Diſeaſes; and that which ſeems moſt to recommend them is, their *extravagant Price*.

Much eſteemed by many Writers, but in Truth of little Purpoſe *in* Phyſick.

III. That ſome *Diſtillations* may be made by *Froſts*, I have this Proof: At my requeſt you were pleaſed to get me a *Thermometer* of a very ſmall and ſlender Stem, eſpecially the higher Parts for 10 Inches near the Head. The *Spirit* of *Wine* is very deeply tinged, which renders it in that Smallneſs clearly viſible. I expoſed it out of Doors in the *hardeſt Froſts* of the extream Winter, *An.* 1665, when the Winds were alſo violently ſharp. In thoſe *Froſts* there aſcended to the Top of the Glaſs ſmall *Drops* like a *Dew*, which afterward in Time deſcended into the Stem, and filled up the Space of an Inch or thereabouts, and it was as clear, and bright, and more flickering, than any Cryſtal, or Glaſs. On the contrary, in the *Heat* of the *Summer*, I placed a ſtronger *Thermometer* of ſlow Motion on a Sunny Wall, till a Part of the Liquor aſcended into the Top, and there continued ſome Hours: Then by ſloping the Glaſs I divided it from the reſt at a little Diſtance: And this took up two Inches in the Stem, being at firſt of a very pale Reddiſhneſs. I gueſs it contained much of the *Spirit* of *Urine*, *which at firſt was intermingled with the Spirit of Wine*; but in a ſhort Time all the Reddiſhneſs was quite conſumed: And ſince it remains of a tranſparent, but very dull Clearneſs, in no Degree ſo bright and flickering as the other.

Cold Diſtillations; *by Dr.* Jo. Beale. *n.* 56. *p.* 1140.

Whether this may prove a *Diſtillation* of the ſame Kind, and not differing from *Diſtillations* by *Heat*, I know not: But we are ſure, that *falſe* Grounds and *vain* Hopes have done infinite Good to us, and to our Poſterity, by *Pyrotechne*; and why may not we accept of *ſpecious* Hopes to attempt ſomething in *Pſychrotechne*?

IV. After this learned and experienced *Phyſician* and *Chymiſt* had often with himſelf conſidered what the Reaſon might be, why the chief *chymical Operations* had been hitherto contemned, and by ſome reputed even for Chimera's, he affirms to have found at laſt, that the true Cauſe thereof is, that the *Artiſts* have not made Uſe, as they ſhould, of thoſe Means and Ways that would have made them ſucceſsful. Now of thoſe Means he aſſureth, by his own Experience, theſe three to be the moſt eminent and the moſt admirable for Uſe, *viz.* *Digeſtion*, *Fermentation*, and *Triture*; Operations ſufficiently diſcourſed of, but in his Opinion, little underſtood as to their Efficacy and Uſefulneſs, which he here undertaketh to make out by ſome conſiderable and uncommon Experiments.

The great Uſe of Digeſtion, Fermentation, *and* Triture; *by Dr.* Joel Langelot. *n.* 87. *p.* 5052.

Firſt, Then he ſhews the excellent Uſefulneſs of *Digeſtion* in the Preparation of the *Volatile Salt* of *Tartar*: Where having mentioned the Difficulties and Unſucceſsfulneſs in other Proceſſes, tried by him, he aſſures us, that as ſoon as he made uſe of a long *Digeſtion* he ſucceeded ſo well, that the very firſt Time he obtained what he feared he ſhould not have gotten by many *Cohobations*, which was a pure white *Volatile Salt* of *Tartar*, leaving behind a few white inſipid *Fæces* of an earthen Colour.

To this he adds another great Uſe of *Digeſtions*, in duly preparing the *Eſſences* of *mineral Sulphurs*; inſtancing an Experiment made upon *Corals*, as moſt clearly of all repreſenting that great Power of *Digeſtions*. He poured then, ſome Years ago, upon Fragments of *Red Coral* an *Oil*, which among all diſtilled Vegetables is, as far as he knows, the mildeſt; deſirous to try whether he could extract a *Tincture* therewith. But finding after a long Time no Change at all in the *Coral* nor *Oil*, he laid by all Thoughts of it. But having one Winter other Things to *digeſt* in a *digeſting Furnace*, he thought good to reſume that *coralline* Operation, and to give the *Bolthead*, wherein that Matter was yet contained, a Place there, not without good Succeſs: For within a Month's Time, when he ſtirred it, as he uſed to do, he perceived that the Bits of *Coral* had a higher Colour, and were grown ſofter, yet without any Change in the *Oil*. He therefore continued the ſame Degree of Heat, and after ſome Days ſaw, to his Wonder, that the *Corals* were altogether *diſſolved* into a very red *Mucilage*, yet the *Oil* ſtill ſwimming upon them in the priſtine Form, without having received any Tincture at all. He did ſhake the Veſſel vehemently and often, to ſee whether he could unite the *Oil* with the *Mucilage* of the *Corals*; but all was in vain, the *Oil* ſtill aſcending when the Veſſel was at reſt, and the *Mucilage* ſubſiding. Whereupon he tried whether he could combine them by *Digeſtion*; but that alſo not ſucceeding, he poured off the *Oil* (which he found to retain almoſt its former Scent and Taſte,) and poured upon the remaining *Mucilage* ſome *tartarized Spirit* of *Wine*, of which by a ſhort *Digeſtion* it was reſolved into a highly *red Tincture*.

By theſe two Experiments, the Author thinks he hath made it evident of what Value the hitherto neglected Works of *Digeſtion* are; as alſo given a Hint of the great Efficacy there is in *volatile Salts*, if they be fettered, and kept from Avolation.

Secondly, To ſhew the Power and Uſe of *Fermentation* in *Chymiſtry*, he inſtances firſt in a true *Volatilization* of *Salt* of *Tartar* by means of the ſame; paſſing by what he hath performed thereby, upon *Antimony*, *Pearls*, *Coral*, *&c.* He ſaith then, that to obtain the *Spirit* of the *volatile Salt* of *Tartar*, he proceeded thus: He took of *crude Tartar*, 2, 3, or more *Pounds* (according to Pleaſure) and firſt *calcined* it ſlightly, and only to ſome Blackneſs, to have what is moſt neceſſary, a *Ferment* to *ferment* the *Tartar* with. Having put this into a large Pot, he poured on it ſo much Water, that it ſtood an Inch high above it. 1. Then he gave it at firſt a *gentle Fire* to make it lukewarm; which done, he poured into it *half a Handful* of finely *pulverized Tartar*, and ſhortly after ſaw ſome Bubbles ariſe, that encreaſed more and more. Which perceiving he continued, as he had begun, at ſeveral Times to pour in more *Powder* of *Tartar*, whereby the *Fermentation* was raiſed and quickened, the Bubbles thereupon riſing in ſo regular an Order, as they had been natural Grapes, the Colour excepted. But here he was to keep a very exact *Regiment* of the *Fire*, ſuch as all *Fermentation* requireth; and took Care alſo, leſt by a too copious Affuſion of the ſaid Powder, the *Ebullition* ſhould grow too vehement, and the Pot run over. The *Fermentation* ceaſing, he put all that was in the Pot into an *Iron Bolt-head* (a *Glaſs* one being in Danger to be broken) to which he often applied a wet Linnen-Cloth, thereby to hinder a too great boiling up of the *fermented Tartar*, which elſe will ſuddenly run up and paſs into the *Recipient* itſelf. Wherefore the *Fire* is alſo very carefully to be governed, and encreaſed by little and little; though at laſt it muſt be ſtrong, to force up all the *Salt*. Which being obſerved by him, he found the groſs and feculent *Tartar* by the ſaid *Fermentaiion* ſo *volatilized*, that there remained not any *fixed Salt* in the *Caput Mortuum*; which, he ſaith, he hath experienced more than once. He adds, that the Liquor obtained from thence, having much Water in it, added for the Sake of the *Fermentation*, is alſo to be much *rectified*, and that ſo far till it appear whitiſh; which ſhews that it holds a due Quantity of *volatile Salt*. Which *Salt*, of what Value it is, this Author would have us to eſtimate from the Teſtimony of *Van Helmont*, *c.* 15. *de Feb. p. m.* 780, and from the wonderful *Virtue* himſelf ſaith to have found in it, both in *internal* and *external Affections* of the Body, and even in *Gangrenes* themſelves: Beſides, that by means thereof he hath prepared ſome *Eſſences*, which in vain he had tried to make ſome *Menſtruums*.

Another Inſtance he gives us of the great Uſe of *Fermentation* in ſeparating *impure* and *noxious Sulphurs*; which he preſcribeth to try in *Opium*, whereby, according to him, it becomes not only a very *ſafe Medicine*, but alſo a highly uſeful one for very many Caſes, if rightly uſed.

Take then, ſaith he, of true *Theban Opium*, ſliced, 1 Pound, and pour upon it in a low Cucurbite 10 *Pounds* of freſh *Juice* of *Quinces* very ripe, adding to it 1 *Ounce* of pure and very dry *Salt* of *Tartar*; expoſe it to a gentle Heat for a Day or two, until there appear ſome *Bubbles*, which is a Sign of the *Fermentation* at Hand. Then, to further the ſame, add 4 *Ounces* of *Sugar* very finely pulverized, and obſerve ſtill ſuch a Degree of Heat as the *Fermentation* requireth; which by ſo doing will duly proceed, and you ſhall ſee the *Opium* manifeſtly riſe and diſſolve *per minima*; taking Heed mean while of the ſtrong-ſcented *ſtupifying Sulphur*, which then is wont to ſteam out. You will then alſo ſee a Part of the impure volatile Scum to emerge at the Top, and the more terreſtrial to ſubſide at the Bottom of the Veſſel; the purer Part ſtaying in the Middle, which is a red Liquor, like a *Ruby* Tranſparent; which you are with Care to *ſeparate*, *filtrate*, and by a due *Diſtillation* to thicken to the *Conſiſtence* of *Honey*. And this you muſt again diſſolve by an highly *rectified Spirit* of *Wine*, *filtring* it, and *digeſting* it for a *Month*, that whatſoever of Crude there may yet be in it, may be by that celeſtial Fire ripened and brought to Perfection. This *Spirit* being abſtracted to a due Conſiſtency, you will find this *Eſſence* to be of that Virtue, that the 4th *Part* of a *Grain*, or at moſt *half* a *Grain*, taken in a proper Vehicle, moiſt or dry, will perform very wonderful Things.

3. Having diſpatched *Digeſtion* and *Fermentation*, he comes now to *Trituration*; by which alone he eſteems many great and admirable Things may be performed in *Chymiſtry*: To which he is perſwaded he ſhall very eaſily obtain the Aſſent of all thoſe that ſhall but obſerve and well conſider the two following *Operations*, both experimented in the *Laboratory* of *Gottorp*, in the Preſence of the late Duke *Frederick*, a Prince exceedingly well verſed in all Kind of Knowledge, eſpecially that of *Chymiſtry*.

The *firſt Operation* was made upon *Gold*; which, though the moſt *fixed* of all Bodies we know, was, though it will not yield to *Fire*, nor to any other known Diſſolvent, maſtered by *Grinding*; which he aſſureth himſelf to have been an Eye-witneſs of. But this he did by means of a ſingular Inſtrument, by him called a *Philoſophical Mill*, whoſe Structure is thus deſcribed.

Fig. 82.

A, A *Leaden Head* pretty thick.
B, The *Axis*.
C, An *Indented Drum*.
D, A *Drum* conſiſting of *Coggs*.
E, A *Mortar*.
F, *Peſtles*.
G, A *Handle*, by which the *Mill* is turned.

a, The ſuperior Part of the *Axis*, which is round.
b, The inferior Part of the ſame, which is *ſquare*.
c, *d*, Here both the *Peſtles* are affixed to the *Axis*.
e, Here the *Peſtles* are *ſtrengthened* by a ſtrong Braſs-ring.
f, *f*, Here both *Peſtles* are *ſtrengthened* by two Braſs-caſes.
g, *g*, Both the thick *Peſtles* of *Glaſs*.

The *Operation* itſelf follows.

Put *Leaf-Gold*, as much as you pleaſe, cut very ſmall, into a very thick *Glaſs-Mortar*, or into one of *Gold* (ſuch an one as the late *King* of *Denmark*, a little before his Death, cauſed to be made for this *Operation*.) In this *Mortar*, covered only with Paper, leſt any Duſt or other Thing ſhould fall in, *grind* the ſaid *Gold* Night and Day by an uninterrupted Agitation of the Mill, till you ſee it reduced into a duſkiſh Colour. For which *Grinding* there are commonly to be allowed 14 *Days* and *Nights*. But if you will only work by Day, there will need a whole *Month*. This done, put the *Powder* into a *Retort*, not very deep but ſhallow, ſuch as the *Engliſh* ones uſe to be; and *drive* it by a *Fire* of *Sand* by Degrees, but at laſt by a very *ſtrong* one; and there will come over a few, but very *red Drops*, which being *digeſted* either *per ſe*, or with *tartariſed Spirit* of *Wine*, give you a true *Aurum Potabile*, which is ſincere, and unimbrued with any Foreign Quality.

The Remainder, though they could alſo have eaſily *reſolved* by *grinding*, yet they thought good to make an *Extract* of it by means of their *philoſophical Acetum*, made of *Verdegreaſe*, *Sulphur*, and a *highly rectified Spirit* of

Wine, by a long *Digeſtion*: Whereby they got again a *Tincture* ſufficiently *red*, and of very great Vertue. And that little that remained, which was but very little, they reduced into a Body by the means of *Borax*; but it wanted its due *Weight*.

'Tis true, ſaith our Author, that at the firſt View this *Operation* ſeems to be groſs, requiring much Time and Labour, but little *Art*; but well conſidered, it is highly admirable, being aſſiſted by the wonderful *Salt* of the *Air*, as the only *Catholick Diſſolvent*. And that *Salt* is, by the continual *Grinding*, attracted and intermixed, many other *Experiments*, made by him about it, have taught him; which he reſerves for the Publication, hereafter to be made, of the Things done in the *Gottorpian Laboratory*.

The ſecond *Experiment* of the Uſe of this *Grinding*, was in a true and genuine Preparation of the *Mercury* of *Antimony*: A *Proceſs* affirmed not only made by himſelf before his *Prince*, but alſo by the Hands of that very experienced *Chymiſt* of the *Elector* of *Saxony*, *Johannes Kunchelius*.

The *Operation* conſiſts in this; *Grind* firſt the *Regulus* of *Antimony* into an impalpable Powder; and to 1 *Pound* of it add 2 *Pounds* of very pure and dry *Salt* of *Tartar*, and 8 *Ounces* of *Sal Armoniack*, and mix it well together. Then moiſten it with ſome *Urine* of an healthy Man, eſpecially of one that drinks Wine, if ſuch may be had; and take Care to have this Mixture *ground* for a whole *Day* together, without any Intermiſſion, by two very ſtrong young Men; always, if there want Moiſture, ſprinkling *Urine* upon it, that it may ſtand 3 Inches high over it, and cloſing it well, keep it in *Digeſtion* for a whole *Month*, daily ſhaking it. And if, during that Time, the Maſs appear to be dry, pour on more *Urine*. The *Digeſtion* being ended, form the Matter into *Globules* with equal Parts of *beaten Glaſs* and *Calx viva*, and dry it in the *Shade*. Of theſe, *extract* the *Mercury* in Manner following:

Let there be ready an oblong Iron-Veſſel, like a *Bolt-head*, into which pour cold Water, and dig it into the Ground: Upon it put an Iron Plate with many Holes in it, and lay thereon the ſaid *Globules* well dried; then fit alſo an *Iron Head*, ſomewhat flatted, to it, that you may conveniently lay Coals thereon, and thus keep a moderate *Fire* for 4 *Hours*, then encreaſe the *Fire* for as many *Hours*, unto the laſt. After that, let it cool, and beware not to ſtir the Veſſel digged in the Ground, nor to pour out the Water, before that be altogether cooled, or elſe you will loſe a great deal of the *Mercury*; as happened, it ſeems, to our Author, when his Prince being impatient of Delay, commanded the Water to be poured out before it was Time: For the *Mercury*, being by ſo *ſtrong* a *Fire* reſolved into Atoms, is to be *coagulated* again by *Cold*.

This *Mercury* of *Antimony* our Author glorieth in, as having prepared and handled it with his own Hands, and ſeen it with his own Eyes, after the finiſhed *Diſtillation*, running in the Bottom of the Veſſel. Neither doth he care if any do call it a *Non-Entity*, or if any unwary Laborants be unſucceſsful in the *Operation*: It is ſufficient to him, that he hath alledged nothing but what he hath tried himſelf, and candidly deſcribed. He wiſheth ſuch *Operators* to conſider, how many Things there are to be obſerved before and in the *Operation*, and even after it, if you will be certain thereof. Which, he ſaith, may plainly appear even by the *Operation* of the *Tartar* alone; for as much as all *Tartar* is not equally good, and himſelf hath met with great Diverſity of the ſame: Beſides which, great Care is to be had of the *Fermentation* itſelf of the *Tartar*; for if it be not duly made, the *Tartar* will not be reſolved *per minima*; nor will the Grapes be repreſented in that natural Shape they ought to be; nor will all the *Salt* (which is the main thing) be *volatilized*. Further, if perhaps the *Fire* be exceſſive, during the *Diſtillation*, much of the *volatile Salt* will be burnt up, and it will yield a ſtrong ſmelling *Spirit*.

Having diſpatched this, the Author ſubjoins an Account he met with among his Papers, of another Way of *Operation* of *grinding* of *Gold*; which, though he hath not yet tried, yet it ſeeming to him very likely to ſucceed, he ſcruples not to communicate alſo. The Inſtruments to be uſed therein, he deſcribes thus:

Fig. 83.

a, A *Mortar* of very fine *Steel*.

b, A *Body* ſerving for a *Peſtle*, of the ſame *Metal*, which is to fit the *Mortar*; as it is delineated in the *Figure*.

c, Is a ſmall Space, where is interpoſed a *golden Plate* half a Ducat thick.

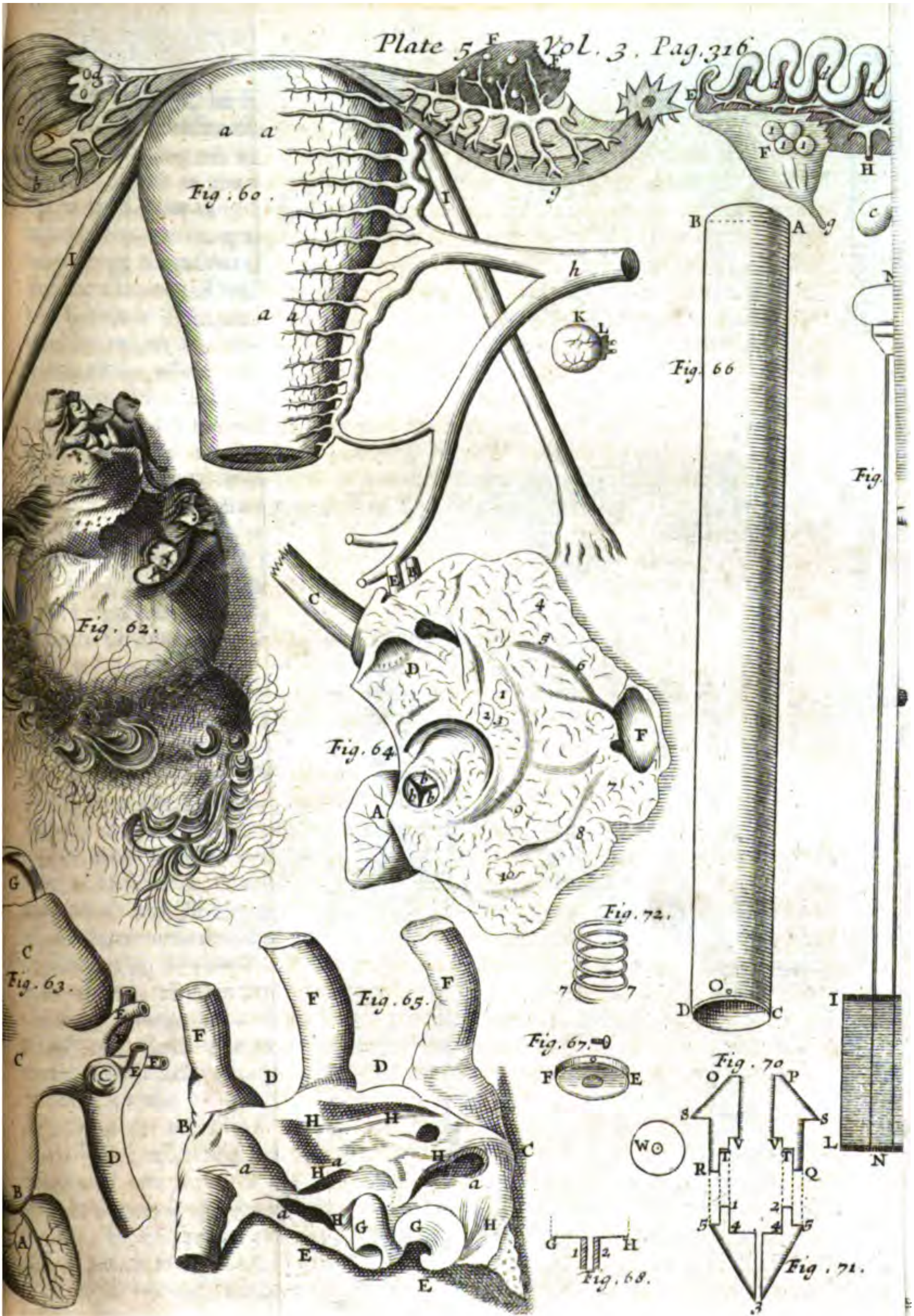
d, The *Handle*, by which the *Peſtle* is to be managed in the Work of *Grinding*, which is to be continued for 3 *Weeks*; at the End of which the *Gold* will be reſolved into a *potable Liquor*.

This Way, as it is much ſimpler, ſo it is by the Author eſteemed much more expedient than the former, by reaſon of the *ſulphury ſaline* Quality of *Iron*, which by *grinding* being opened and highly ſubtilized, acts the more powerfully upon the moſt ſolid Body of *Gold*, and attracts withal the *Salt* that is in the *Air* in greater Plenty than can be done in a *Glaſs* or *Golden Mortar*. And if it be objected, that by that long continued *Grinding* the ſteely Particles are worn off, and commixed with thoſe of the *Gold*, the Author would have it conſidered, how great a *Cognation* there is between thoſe *Sulphurs*, and alſo how great is the Uſe of *Digeſtion*, ſeparating the Pure from the Impure, and withal exciting that occult *Fire* of *Mars*, well known to the true Searchers of Nature; which being aſſiſted by the *Alcohol* of *Wine*, is able to *concoct* the little *immature* Portion to a due *Maturity*.

The Volatilization *of* Salt *of* Tartar *elucidated*; *by Dr.* Dav. von der Becke. *n.*92.*p.* 5185.

V. This Author having (as he affirms, and as will appear by the Sequel) formerly taken Pains in the *Fermentation* of *Tartar* for the *volatilizing* the *fixed Salt* thereof, he endeavours here to declare his Thoughts about the Cauſes of his undertaking that Labour, and of the Manner how that *Volatilization* is performed. In the doing of which he labours to ſhew, *Firſt*, The Cauſes of the *Fixation* of the *Salt* of *Tartar*; *Secondly*, The Reaſons of the *Volatilization*; and *laſtly*, what Degree of *Volatility* the *Salt* of *Tartar* hath acquired in that *Fermentation* made with its own *Ferment*.

Plate 5. Vol. 3. Pag. 316



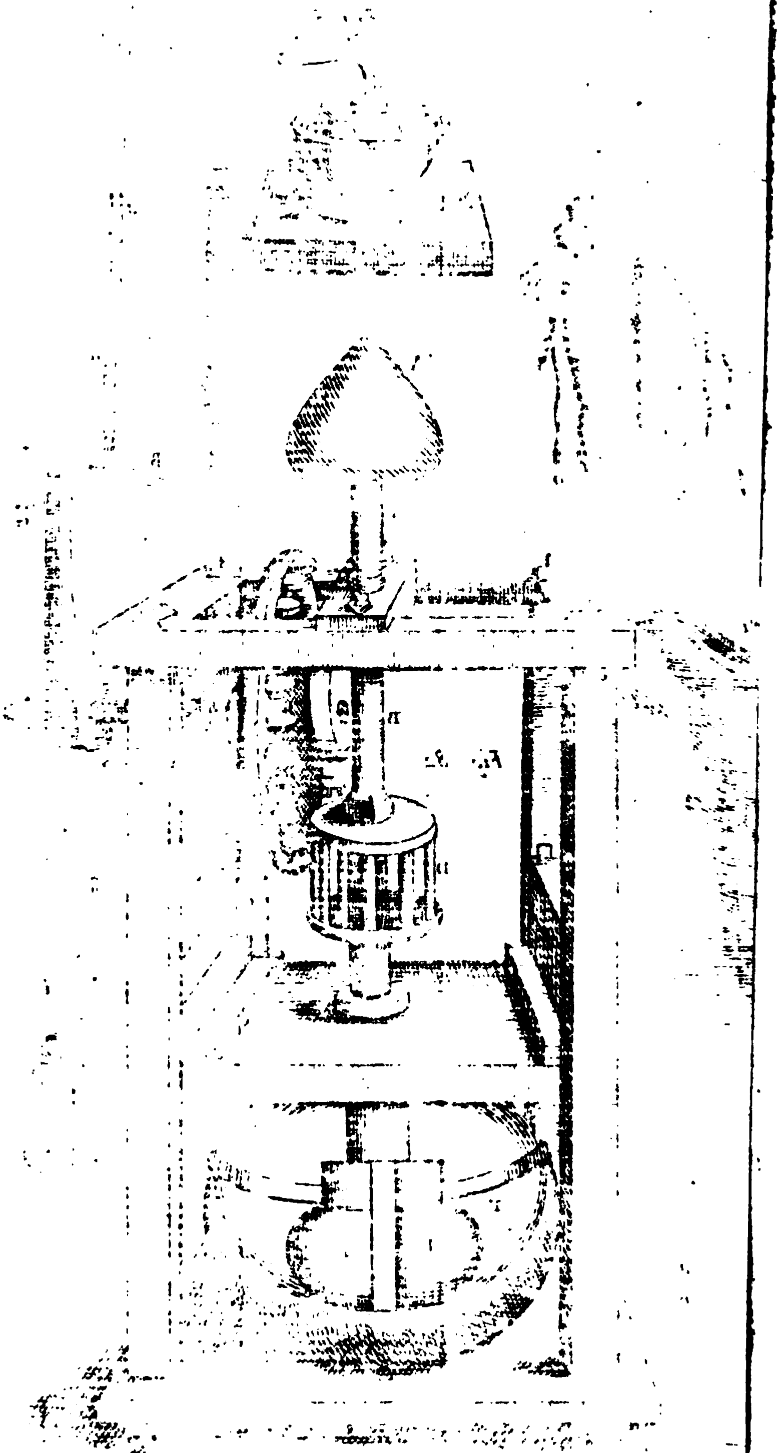


Fig. 3

As to the *firſt*, he begins with blaming thoſe that divide *Salts* into *Fixed* and *Volatile*, foraſmuch as, in his Opinion, that Diviſion is unknown to Nature, there being not to be formally found in any Body before *Calcination* any *fixed Salt*, ſuch as the *alcalizate Salt* of *Tartar* and other *fixed Salts* are produced by *Calcination*. He therefore informs us, that *Salts* that are *volatile* before *Incineration*, are by the Action of the *Fire*, as the Efficient, ſo colliquated among themſelves and with the Earthy Particles, as to be *fixed* thereby. For the clearing of which he preſuppoſeth, with ſome others, that there are two Kinds of *Salts*, an *Alcali* and an *Acid*, as the genuine Inſtruments of Nature, by which the ſeveral Kinds and Seeds of things are put forth, and which every where are imployed in the *Germination* of *Plants*, and the firſt *Conceptions* of *Animals*, and in all the *Beginnings* of *Fermentations*. Theſe two *Salts* he affirms to be both *volatile*, and therefore eaſily reſoluble by the ſupervening *Salt* of the *Air*: Since it appears, that all *Vegetables*, eſpecially *Aromaticks*, if they be any conſiderable Time expoſed to the *Air*, loſe their *Salts*; and that Wood in particular, by the Action of the *Air*, conſuming the *volatile Salt*, doth in Time quite moulder away. Whilſt therefore theſe *Salts* are looſened and ſet at Liberty by the *Fire* (for elſe they would not act) they began to operate on one another; the *volatile Acid*, whilſt it works upon the *volatile Alcali*, fixeth it, and they are colliquated together. Which Operation of Nature being well obſerved, it will be manifeſt that that received Axiom, *Things volatile are fixed by thoſe that are fixed, and Things fixed rendered volatile by thoſe that are volatile*, is falſe. Now that *volatile Salts* are conſumed by the *Air*, and *colliquated* by *Fire*, is ſo notorious, that common People are wont to ſink in Water ſuch Timber as they would preſerve from *Putrefaction*, thereby to keep it from *Air*, and to harden it to a great Degree for ſtrong Supports of Buildings. Hence alſo they ſlightly burn the Ends of Timber to be ſet in the Ground, that ſo by the *Fuſion* made by *Fire* the *volatile Salts*, which by the Acceſſion of the Moiſture of the Earth would eaſily be conſumed to the Corruption of the Timber, may catch and *fix* one another. For which Reaſon alſo, namely, the *Fuſion* of the ſame *volatile Salts*, Ship-wrights are wont to burn the lowermoſt Part of Ships that lies under Water. And to uſe a very common Inſtance, *Soot*; it is known, that whilſt the Wood is burning, the *Smoak* aſcends, wherein the two *volatile Salts* are contained, that *coagulate* one another into *Soot*, which two *Salts* may thence eaſily be ſeparated and made viſible, and theſe *volatile Salts* conſtituting the *Smoak* and the *Soot*, riſe ſo long until the Wood be quite reduced to *Aſhes*, in which the remaining *volatile Salts* are *colliquated* to a *fixed Salt*, eaſily to be waſhed out by Water. Theſe two *volatile Salts* therefore afford the Matter, of which the *fixed Salt* is made by Means of the Fire: Whence it is evident, that we muſt (as really we do) obtain ſo much the more *fixed Salt*, the more *volatile Salt* there was before *Incineration* in the mixed Body; as alſo why out of *Herbs* freſhly burnt to *Aſhes*, we get a greater Quantity of *fixed Salt*, than when they have been dried up; becauſe the *Air* by its Operation (which is ſomewhat advanced by the Moiſture in the Plant itſelf) diſſolving the *Salts*, hath robbed them of the greateſt Part of their *volatile Salts*. Upon which ſame Account, Wood, decayed and mouldered away, contains almoſt no *fixed Salt*, as it hath alſo loſt almoſt all its Weight.

Having thus ſhewed, that before *Incineration* there is found in mixed Bodies no *fixed alcalizate Salt* at all, and how the *volatile Salts*, by *Calcination*, are brought to *Fuſion* and ſo *fixed*; the Author, further to make out the *Fixation* of ſuch *volatile Salts*, takes Notice of the Mixture of *earthy* Parts in ſuch Bodies, ſome of which, when thoſe two *volatile Salts*, thus opened by the *Fire*, act on one another, are *coagulated* with them. Which he conceives to be the Caſe, when the ſaid two *Salts* being concreted in the *Kidneys*, they by their Aſperity wound the ſanguineous Veſſels (whence the *nephritick Pain*) and ſo *coagulate* together with them the extravaſated Blood, which makes the *Stone* of the *Kidneys reddiſh*; as the *Stone* of the *Bladder* is *whitiſh* from the mucous Subſtance of the *Bladder*, therefore given it by Nature, leſt the ſharp *Urine*, by working upon its Membranes, ſhould cauſe Pain, being *coagulated* together. And ſo he obſerves that the *Stones* concreted in the *Bladder* of *Gall*, taſte bitter by reaſon of the *Gall* that is *coagulated*.

This *Earth* then, when by the *Fire* it is intimately united with the *Salts*, and has been in a manner *vitrified* with them, keeps them ſo cloſe together, that they can no more riſe and fly away than Birds faſtened to a Rock; thoſe *Salts* being rendered ſo *fixed*, that by a gentle *Fire* they are not ſo much as at all moved; by a ſtrong one brought to *Fuſion*, and united with a conſiderable Quantity of *Earthy* Particles, by an extream Degree of Heat *vitrified*. So if you mix *fixed Salt* of *Tartar* with *Cinnabar* of *Antimony*, or with *Quick-ſilver*, all the *Quick-ſilver*, though a very ponderous Body, will paſs into the *Retort*, but the *Salt* of *Tartar*, by reaſon of its *Earth*, remain at the Bottom of the Veſſel. Whence he eſteems it evident, that the *fixed Alcalies*, eſpecially that of *Tartar*, cannot by reaſon of the *Colliquation* of the *earthy* Parts, penetrate into Bodies to be diſſolved, nor conſequently remove the inmoſt Seeds of Diſeaſes.

Now, in the *ſecond Place*, though the *Volatilizing* ſuch *fixed Salts*, and particularly that of *Tartar*, hath hitherto been found a very difficult Work, yet doth our Author conceive it would be very eaſy, if we took but Nature for our Guide, and but ſeparated from *Salt* of *Tartar* the *fixing Earth*, that has been proved to be mixed with it; for the doing of which he refers to the Preſcript of Dr. *Langelot*, requiring that the *fixed Salt* of *Tartar* be mixed with its genuine *Ferment*, viz. *Crude Tartar*, or (if in the *Fermentation* you have a Mind to ſee the *Grape* like *Bubbles*) *Cream* of *Tartar*, and ſo expoſed to *Fermentation*. In which Commixture of *Ferment* he would have this eſpecially obſerved, that it be mixed to the very Degree of *Saturation*, and until the *fermenting* Agitation and the Motion of the *ſaline* Particles do ceaſe, as a Sign that there is not any Particle of the *fixed Salt* of *Tartar* left unconjoined with the *acid* Particles of the *crude Tartar* or its *Cream*, nor any *acid* Part of the *crude Tartar* not ſaturated by the *fixed Salt*. Which being obſerved, the *Diſtillation* will, the Action of the *ſaline* Particles being thus ſtopped, the more ſecurely be done. Mean time, that only the *acid* Particles

Vid. ſup. Sect. 4.

ticles of the *crude Tartar* are laid hold on by the *fixed Salt*, and not the *alcalizate*, he promiſes a Proof of hereafter.

But ſince the main Queſtion is about the *new Volatilization* of the *fixed Salts*, the Author is altogether perſwaded, that in his *Fermentation* of *Tartar*, it is not chiefly the very *fixed Alcali* of *Tartar* that is again *volatilized*, but rather the added *Ferment*, which is the *crude Tartar*. For in his *crude Tartar*, though there be no *fixed Salt* in it (which he hath aſſerted generally of all Mixtures) yet the *volatile alcalizate* Particles of the *Tartar* are detained by the *volatile Acids* of the ſame, commixed with it to the very Degree of Saturation: Whence they are *fixed*, foraſmuch as theſe two when conjoined do *fix* one another, when ſeparated, become again *volatile*. Which Manner of *Fixation* he calls *natural*, being ſhewed us by Nature; as that which is made by the *Colliquation* of the *Earth* by *Fire*, *artificial*, becauſe only performed by Art; upon the Account of which, *volatile Salts* are detained no otherwiſe, than Birds tied to a Rock are reſtrained from flying away.

Now, though indeed the *fixed Alcali* of *Tartar* is in this *Fermentation* freed from that *Earth*, to which, by the *Fuſion* of the *Fire*, it was intimately united; yet, notwithſtanding this, it is *fixed* again, ſaith he, by the *Acid* of the *tartareous Ferment*. For the clearer Proof of which, he makes uſe of the *urinous Spirit* of *Sal Armoniac*, in which there are two *volatile Salts*, an *Urinous* and *Acid*. Theſe two *Salts*, ſaith he, though they be *volatile* when ſeparate, yet when united they detain one another, emulating, as it were, the Nature of *fixed* ones, ſince they are neither diſſolved in the Air, nor emit any Odour, as true *Volatiles* are wont to do. Now to obtain out of this *Salt* the *urinous, volatile Spirit*, there is requiſite a Separation of theſe 2 *Salts*; for this Bond being diſſolved, the *Urinous* immediately riſeth. To obtain which, Water is poured upon the *Sal Armoniac* (becauſe *Salts* act not but when diſſolved) and then there is added a *fixed Sal Alcali*, which whilſt it is joined with the *acid* Portion of the *Sal Armoniac* (for the more *fixed Acid* is ſooner united with the *fixed Alcali*, than with the *volatile*) the *volatile urinous* Part quickly deſerts its fellow *Acid*, and being conjoined with the Water, yields a moſt *volatile* and piercing *Spirit*, which, though the *Sal Armoniac* before the Commixture of the *fixed Sal* was quite inodorous, yet now after the Addition thereof, ſtrikes the Noſe moſt violently, and that even when put from the *Fire*; inſomuch that if you do not, after the mixing of the *fixed Salt*, very accurately cloſe your Veſſel, you will afterwards find no *Spirit* at all. Wherefore, as in this Example of *Sal Armoniac*, the *fixed Salt* added, freeth the *alcalizate* Portion of the *Salts*; ſo in this *Fermentation* of *Tartar*, the *Tartar calcined* to *Blackneſs*, or the *fixed Salt* of *Tartar*, freeth the *alcalizate* Part of the *crude Tartar* from the *acid* Parts. For, ſaith he, in the *Crude Tartar*, or its putrified *Cream*, there are, as in *Sal Armoniac*, two *volatile Salts*, an *Alcali*, and an *Acid*, from the *Colliquation* of which (as hath been ſaid) the *fixed Salt* reſults; ſince it is notorious, that in the *Fermentation* of *Wine* the *acid* Particles do *coagulate* the ſuperabounding *alkalizate* with the *terreſtrial* ones, to the very Degree of Saturation and ſo by their increaſed Weight take Place in the lower Part of the Veſſels.

If therefore to this *Tartar* pregnant with *Salts*, *crude* or *depurated* by a Solution in Water, you add a *calcined Tartar*, or, which is the ſame, *Salt* of *Tartar* itſelf, immediately this *fixed Salt* will lay hold on the *acid* Portion of the *crude Tartar*, and, as in the *Sal Armoniac*, ſo here, free the *volatile Alcalizate*; from which Conflict and Action of the *Salts* on one another, *Grape-like Bubbles* will ariſe. And this Injection of *calcined Tartar* muſt be continued, until all *Fermentation* do ceaſe; that is, to the very Degree of Saturation: Which, unleſs it be well obſerved, many Inconveniencies will obſtruct the Operator. But this *volatile Alcali* being, by means of the *calcined Tartar*, freed from its *Acid* (like the *Urinous* of the *Sal Armoniac*) will preſently fly away. Wherefore, if this *volatile Spirit* could forthwith be received, it would afford a real *volatile Salt* of *Tartar*, eſpecially if by Art it were freed from its *Phlegm* (which makes it a *fluid Spirit*) and without the Addition of any extraneous Thing, *coagulated* into *Salt*. But this cannot be, ſaith he, ſeeing that, before all the *Fermentation* and Motion of the *ſaline* Particles ſhall have ceaſed, this *Mixture* cannot be put into the *Cucurbite*, becauſe it would break the Veſſel; nor can the *fixed Salt* be added to the diſſolved *crude Tartar* all at once, but at ſeveral times, becauſe elſe all the *fermented* Part would quickly get out at the Edges of the *Cucurbite*. Now then, ſince every time there is, by the Addition of *fixed Salt*, ſo much of the *volatile Acid* freed out of the *crude Tartar* as much as there is added of *fixed Salt*, and that preſently flies away, it certainly follows, that, if by Injections ſeveral times repeated you come at laſt to the Point of *Saturation*, there will remain no *volatile alcalizate Salt* at all of the *crude Tartar*.

Since therefore there is no Hopes of obtaining the *volatile Salt* from *crude Tartar* this Way, we muſt endeavour to get it by an Addition of *Tartar calcined*, or *fixed Salt*; and how this is to be done, hath been already intimated, *viz.* by the Separation of the *earthy* Parts. For as the *volatile alcalizate* Particles, upon a very vehement *Colliquation* of the *Fire*, are, by an intimate Union with the *earthy* Parts, kept from aſcending; ſo alſo, when freed from theſe *terreſtrial* Fetters, they are reſtored to their former Freedom and *Volatility*. And this Separation of the *Earth* we obtain by this *Fermentation* of the *Tartar*; for, in the ſame Moment that the *acid* Portion of the *crude Tartar* is conjoined with the *Tartar's fixed Salt*, to ſet the *volatile Alcali* of the *crude Tartar* at Liberty, there is alſo made a *Precipitation* of that inſipid *Earth*, which by the extream Degree of *Fire* was united with the *Salt* of *Tartar*, and had *fixed* it before.

But to expoſe this *fixing Earth* to the View of all, I ſhall alledge the Example of *vitriolate Tartar*, known to the very Apprentices of *Apothecaries*. In this Operation, whilſt the *Spirit* of *Vitriol* is affuſed to the diſſolved *Salt* of *Tartar*, or its *Oil* made *per deliquium*, you may obſerve a very great *Effer-*

veſcence, during which and the Action of the *Acid* of the *Vitriol* upon the *Alcali* of the *Tartar*, there is *precipitated* an *Earth* (for the Separation of which, Care is to be had of the Degree of *Saturation* between the *Spirit* of *Vitriol* and the *Salt* of *Tartar*) which afterwards may be ſevered by *Filtration*. Now that this *Earth* is *precipitated*, not out of the *Spirit* of *Vitriol*, but rather the *Salt* of *Tartar*, none verſed in theſe things can be ignorant of. This *precipitated Earth* ſome call the *Magiſtery* of *vitriolate Tartar*, and very impertinently prefer it often in their Preſcriptions to the true *vitriolate Tartar* itſelf. This *Earth* indeed hath a *ſaline Taſte*; but theſe *Salts*, as is uſual in all *Precipitations*, did not only adhere to the Matter *precipitated*, and may, by a repeated Ablution, be eaſily ſeparated; which done, there remains nothing but an utterly *inſipid Earth*, which can have no other Virtue but that of *Exſiccation*. Wherefore after the ſelf-ſame manner, whilſt the *acid* Part of the *crude Tartar* is united with the *alcalizate* of the *Salt* of *Tartar*, the *Earth* alſo of the *fixed Salt* of *Tartar* in the ſaid *Fermentation* will be *precipitated*.

The greateſt Difficulty being thus diſpatched, our Author proceeds, in the Third *Place*, to a leſſer yet remaining, which is; That the *acid* Part, by means of which, the *Earth* was *precipitated*, detains the *volatile alcalizate* Part, and *fixeth* it anew; ſo that his *volatile Salt* of *Tartar* hath hitherto acquired no greater Degree of *Volatility*, than *crude Sal Armoniac*, or the *Flowers* thereof are known to have. For theſe, though they are made up of *volatile* Parts, yet they diffuſe no *Odour* before the Separation of the *volatile* Parts: They alſo endure the *Air*, which no *volatile Salt*, truly ſuch, will do: Wherefore they cannot yet be reckoned among *Volatiles*, ſtrictly ſo called.

Now then, to give this *volatile Alcali* of *Tartar* the laſt and higheſt Degree of *Volatilization*, the Author eſteems it neceſſary that there ſhould be made a new Addition of *fixed Salt* of *Tartar*, which in the ſame manner as before it had freed the *alcalizate* Part of *crude Tartar* from its *acid*, muſt here alſo take from the manifeſt *Acid* of *crude Tartar* the *alcalizate* Part of the *fixed Salt* of *Tartar*, already freed from *Earth*; whereby this *alcalizate* Part of the *Salt* of *Tartar*, truly *volatilized*, being joined to the Water (which was before added for the free Action of the *Salts*) will conſtitute a moſt *volatile Spirit*, which, he ſaith, is *coagulable*, without Addition, into *volatile Cryſtals*, having the perfect Taſte of *Tartar*.

An odd Salt *extracted out of a* metallick Subſtance; *by P.Fr.Lana.* *n.79.p.*3060.

VI. P. *Fr. Lana*, having extracted out of a *metallick Subſtance* a very white *Salt*, the ſame was, upon the Application of the gentleſt Heat, reſolved into a *golden coloured Liquor*; which being removed from that Warmth, as ſoon as it felt the cool Air, and even by opening the Glaſs wherein it was incloſed, did in a Moment *ſhoot* afreſh into the ſame *Salt*; and that (which ſeemed *oddeſt*) whilſt he was pouring it out of one Glaſs into another, during its Fluidity, it was diſperſed all over the Glaſs it was poured into, ſuddenly *congealing* into moſt fine Threads, many of which were extended from one

Side of the Glaſs to the other, and hanging as it were in the Air, formed juſt like the ſubtileſt Cob-webs, not at all rigid, but by reaſon of their exquiſite Subtilty pliable, and ſcarce perceivable by the Eye.

Volatile Salt *and* Spirit *extracted out of all Sorts of* Plants; *by* Dr. Dan. Cox. *n*.100.*p*.7002. *n*. 101.*p*. 4.

VII. Take in warm Weather a conſiderable Quantity of the *Leaves* of any *Vegetable*, ſtripped or pulled from the greater Stalks, lay it on a Heap, preſſing it pretty cloſe together; they will ſoon become very hot, eſpecially in the Middle, and after a few Days reſolve into a pappy Subſtance (excepting the outward Leaves) which being made into Pellets, and put into a *Glaſs Retort*, and *diſtilled*, will yield, beſides a great Quantity of *Liquor*, much thick black *Oil*, of a balſamick Conſiſtence. The *Liquor* being ſeparated from the *Oil*, and *diſtilled* in a tall *Glaſs-body*, a *volatile* Spirit *ſublimes*, which, after one, two, or three *Rectifications*, becomes perfectly *urinous*, not to be diſtinguiſhed, by *Smell* or *Taſte*, from *well-rectified Spirit* of *Harts-horn*, *Blood*, *Urine*, or *Sal Armoniac*.

I never made Trial of any *Herb*, which thus ordered, did not yield the mentioned Subſtances; although I have examined many by this Method of Procedure, which ſeemed very different from each other, as well in ſenſible Qualities as thoſe vulgarly called occult; ſuch as *Rue*, *Sage*, both *Celandines*, *Carduus benedictus*, *Tobacco*, *ſtinking Orach*, *Garden Scurvy-graſs*, the *leſſer Spurge*, *Baum*, *Mint*, *Tanſy*, *Camomil*, *Monk's Rhubarb*, ſeveral *Docks*, and even common *Graſs*, with many others, which it were altogether unneceſſary to enumerate; beſides *Flowers* of *Elder*, *Peony*, *Cowſlips*, *Clove-gilliflowers*, &c. with ſeveral Sorts of *Moſſes* and *Rudiments* of *Vegetation*; which laſt is a green Subſtance on the Surface of the *Earth*, in *Rivers*, *Ciſterns*, where Rain often falls, and on *Ships* between Wind and Water, very apt to run into *Moſs* and *Fibres*.

Note, 1. The *Veſſels* wherein theſe *Diſtillations* were performed, though exceedingly well waſhed with Water, ſcoured with common Salt, Sand, Aſhes, Soap, fixed Salts, *&c.* and afterwards expoſed many Years unto the Air, Wind, Rain, Dews and Froſts, yet nevertheleſs retained a very ſtrong *Smell*, not unlike that of *Muſk*.

2. The Water left at the Bottom of the *Glaſs*, after the firſt *Rectification*, was ſomewhat *acetous*; eſpecially when the *Herbs* were not ſufficiently *fermented*.

3. If the *Herbs* are duly *fermented*, they leave little *Caput Mortuum*; ſometimes not a 20th, and never, by my Trials, above a 10th Part; whereas *diſtilled* before *Fermentation*, they leave much more: And this remaining *Coal*, burnt to Aſhes, yields ſcarce any *Alcali* or *fixed Salt*.

4. The *volatile Salt* is much more than the *fixed Salt* would have been, afforded by the Herb *incinerated* the ordinary Way.

5. All thoſe *Herbs* which yield Store of *fixed Salt*, ſuch as *Wormwood*, *Carduus*, *Mugwort*, *Sage*, &c. do likewiſe, being thus managed, afford plentifully a *volatile Salt*.

6. Theſe *volatile Salts* being highly *rectified*, did not, that I could perceive, *differ* from each other; as neither do *vinous Spirits* of *fermented Vegetables*, or their *fixed Salts*, highly purified and rectified.

7. During the *Fermentation*, the Room would be ſtrongly perfumed at the Beginning with the *natural Scent* of the *Herb*, if it had any eminently peculiar *Smell*; in the Middle, with the *Scent* of a *mixed*, between that and the *urinous*: But being well putrified, became ſenſibly *urinous*.

8. The *diſtilled Liquor* of ſome *Herbs*, at the firſt *Rectification*, yieldeth a *Spirit* very hot; but the laſt inclined rather to that of pungent *vinous Spirits* of *Scurvy-graſs*, *Horſe-radiſh*, &c. being, if I may ſo ſpeak, *piperaceous*, and biting, rather than like *volatile Salts*; but after *repeated Rectifications*, one, two, or more, according to the Nature of the Plant, or Time it had *fermented*, became perfectly *urinous*. This was uſually, when the *Herbs* had not duly *fermented*; which proceeded, in my Apprehenſion, from ſome Commixture of *eſſential Oil*, which by reiterated *Rectifications* is either ſeparated or tranſmuted. The ſame happens in the *vinous Spirits* of *fermented Vegetables*, and in their *fixed Salts*.

9. In the *Diſtillation* of the *putrified Herbs*, the *urinous Spirits* and *Salt* came chiefly at the latter End with the *Oil*, in the Form of a thick white Cloud or Fumes, and condenſing in the *Recipient*, formed an innumerable Company of very irregular crooked Rivulets, exactly after the manner of *Hartſ-horn*, *Blood*, &c. and at the Beginning came the *Phlegm*, with moſt of the *Acetum* in great Drops, with little Fume, and the Rivulets ſtraight, and without *Striæ* and Wandrings.

10. Some *Herbs*, as *Winter-Savory*, *Sage*, &c. in the *firſt Diſtillation* yielded copiouſly a *volatile Salt* in a dry Form, which did coat the *Receiver*, and *ſublimed* into the *Neck* of the *Retort*: So doth *Tobacco*; and once *Saffron* did ſo, in *Digeſtion* with *Spirit* of *Wine*.

11. All *Plants*, thus *fermented*, yielded plentifully (eſpecially toward the latter End of the *Diſtillation*) a *fœtid* groſs *Oil*, which, if the *Herb* was well *putrified*, did not in the leaſt reſemble the Plant which produced it: I could hardly perceive, that they *differed* from each other in either *Taſte* or *Smell*; only, if the Plant was not throughly *fermented*, an *Oil* would come over at the Beginning of the *Diſtillation*, which, as alſo the Water, would retain exactly the *Taſte* and *Smell* of the *Vegetable* which afforded it; and it would be fluid and tranſparent, like other *eſſential Oils*. The *Oil* of Herbs very well *putrified* came over chiefly at laſt, and did require a very ſtrong *Fire* to extricate it out of the Herb; was moſtly, eſpecially that which comes laſt of all, of the Colour and Conſiſtence of *Tar*, very tenacious, and did far and wide emit a very odd, faint, *fœtid*, offenſive, *Odour*: If any thing became infected by this *Oil*, it was not to be freed from it in a long Time.

12. *Herbs*, which *diſtilled* in an *Alembic* with Water yield little *eſſential Oil*, as *Baum*, *Mint*, *Camomile*, &c. afford much of it thus *fermented*: And thoſe that give much *eſſential Oil*, as *Wormwood*, with many others, being *putrified*, yield abundantly more.

13. During *Putrifaction*, the *Herbs* became exceedingly *hot*, eſpecially thoſe that were cloſely compreſſed and had Store of Moiſture in them; ſo that I could as well detain my Hand in the Flame of an ordinary Fire, as in the Midſt of them.

14. Fatty, moiſt, and inſipid *Herbs ferment* much ſooner, and with greater *Heat*, as *Graſs*, *Docks*, *Garden Scurvy-graſs*, *Celandine*, &c. Drier and much more ſapid Plants more leiſurely, and with leſs *Heat*, as *Winter-ſavory*, *Roſemary*, *Sage*, *Rue*, *Mint*. The *Stalks* of no *Herbs ferment* ſo ſoon as the *Leaves* freed from them. This is moſt evident in *Docks*, whoſe tender Parts are pappy and mucilaginous, when the *Stalks* are entire.

15. *Herbs* ſeem, by this *Putrifaction*, to be deprived of their *ſpecifical* or peculiar Properties: *Celandine* loſes its *tinging* Quality, *Spurge*, its *Milk*, *veſicating* and *poiſonous* Nature, *&c.*

16. *Herbs*, which before *Putrifaction* were extreamly *fœtid*, as *Atriplex Olida*, &c. became afterwards either *inodorous* or not ill-ſcented: And, on the contrary, *Monk's Rhubarb*, *Garden Scurvy-graſs*, with many other *inodorous* Vegetables, during *Putrifaction* became abominably, and almoſt inſupportably *fœtid*, like the worſt of Excrements; all which yet they loſt immediately upon *Diſtillation*.

17. None of theſe *Flowers* I have hitherto uſed, do *ſtink* in *Fermentation*.

18. Many of the *Herbs*, thus *putrified* or *fermented*, ſwarm with *Maggots* (an Argument of the cloſe and ſtedfaſt Contexture of the ſeminal Principles in *Inſects*) eſpecially at the Bottom, and in the Middle, whither *Flies* and other *Inſects* can have no Acceſs to depoſite their *Eggs*, and where the *Heat* is ſo violent, that they could not poſſibly ſubſiſt.

19. Yet the *volatile Spirit* and *Salt* is not afforded by theſe *Inſects*: For, having *diſtilled* ſeparately a great Quantity of them, they yielded no *volatile Salt* or *Spirit*, but a *Liquor* of a very different Nature.

20. *Herbs fermented* in a great *Glaſs* with a narrow *Neck*, the Mouth left open, in a few Weeks became, for the greater Part, a *Mucilage*, and *diſtilled* a Year after they had ſtood ſo open, yielded a little *urinous Spirit*, but not a Drop of *Oil*.

21. *Vegetables*, if the external Air be excluded from them, will not *putrify* or *ferment*.

22. Some *Herbs*, *Moſſes*, and *Rudiments* of *Vegetation*, yield a *volatile Salt*, *diſtilled* without previous *Fermentation*; as do alſo many *Seeds*, and ſeveral of them ſufficiently *inſipid*.

23. Theſe *volatile Spirits* and *Salts* have not only the ſame ſenſible Properties, but alſo agree in all known Effects and Operations with common *urinous Spirits* and *Salts*; as, in the changing of *Syrup* of *Violets*, and many other *vegetable Tinctures* green; in being *diaphoretick*, *diuretick*, and *deobſtruent*: Contrary to *Acids*, which they do *mortify*, *precipitate* all Metals and Minerals diſſolved in *acid Menſtruums*; being highly *rectified*, and

mixed with perfectly *dephlegmed Spirit* of *Wine*, ſtrike the *Offa alba*, as Chymiſts ſpeak: They unite with *Acids*, and thereby become *Armoniac*, or *neutral Salts*; and indeed perform whatſoever can be expected or deſired from the common *urinous Spirits* of *Salts*.

No alcalizate Salt *in any Subject before the* Action *of* Fire *upon it*; *by Dr.* Dan. Cox. *n.* 107. *p.* 150.

VIII. 1. The *alcalizate* or *fixed Salts* of *Plants*, extracted out of their Aſhes after *Incineration*, or out of *Tartar* calcined, do, in my Apprehenſion, neither *præ-exiſt* in the *Vegetables* that afforded them, before they were expoſed to the *Action* of the *Fire*; nor do they *differ* conſiderably (I am certain, not *ſenſibly*) from each other.

The former Part of this Poſition may be thus made out.

1. I never yet found that any *vegetable* (or indeed *animal* or *mineral*) Subſtance did in the leaſt meaſure manifeſt to the Taſte, or by its Effects, that it contained any ſuch *Salt*. Many *Plants* and *Roots*, lightly bruiſed, affect the Eyes and Noſe after the manner of *volatile Salts*, and ſeveral do bite the Tongue, and ſtrike upon the Palate. Some *Herbs* yield a copious *volatile Salt* immediately after they are preſſed, by a conſiderable Degree of *Heat*, and many Sorts of *Earths* do abound therewith; ſo that it is highly probable they do often actually exiſt in *Vegetables*, in the very ſame Form wherein they appear to us upon *Diſtillation* from the *Herbs* themſelves, or from *Soot*: And that *acid Salts* do really exiſt in many *Plants*, is diſplayed by their Taſtes and Effects. They may be alſo obtained without *Fire*, or any artificial *Analyſis*, as is evident in *Tartar*, and the reputed *eſſential Salts* of many *Plants*, in *Verjuice*, *Vinegar*, and *Verdegreaſe*, whoſe *Acidities* may be concentred and made to appear in a dry Form. Now did *Alcalies* exiſt in the *Plants* before the *Analyſis*, eſpecially ſo copiouſly as they ſometimes appear afterwards, certainly they would betray themſelves by ſome viſible ſenſible Property, or other Symptom of their Preſence.

2. Did *Alcalies* pre-exiſt in *Plants*, probably *Animals*, whoſe ſole Food they are, would alſo abound therewith; whereas, on the contrary, we do not find the leaſt Foot-ſteps thereof, either in *Blood*, *Urine*, *Bones*, *Horns*, &c. which do all abound with *volatile Salts*; nor in ſome other Parts, Excrements and Juices, that afford Store of *Acidity*, which may frequently, by *Coagulation* be brought to a *ſaline* Form or Conſiſtence. Nor can it reaſonably be pretended, that the *Ferment* of the Stomach and other Parts, ſeveral Digeſtions and repeated Circulations, have altered its Property, and at length rendered it *volatile*; for, *firſt*, *Alcalies* ſeem to be of a very *fixed* Nature, and are not eaſily *volatilized*: And daily Experience will evince, that the Chyle doth not in the leaſt participate, either in Taſte or any other Property, with *alcalizate Salts*. Beſides, *Herbs* taken out of the *Omaſus* of *ruminating* Animals, without any further Digeſtion or Preparation, yield a *volatile Salt*, as when *fermented* or putrified in the open Air, without Additament.

3. Moſt *Vegetables*, whether Woods or Herbs, if burnt whilſt they are green, and with a ſmothering Fire, yield *Salts* which are far enough from

alcalizate, being either *neutral* or *acid*, or, to ſpeak more properly, *tartareous*; for they do almoſt exactly reſemble putrified *Tartar*, and *diſtilled*, yield the very ſame Subſtances. Indeed, ſome few Herbs, ſuch as *Satureja*, *Roſemary*, &c. which abound with ſprightly *volatile Oil*, if they are well dried, upon ſimple *Incineration* yield an *alcalizate Salt*; ſo do ſome dry Woods. But that they are produced by the *Fire*, and not ſeparated, I ſhall anon prove from Experiments, I think unqueſtionable and unanſwerable.

4. In the moſt natural Method of *analyſing Plants*, which is by *Fermentation* or *Putrefaction*, without Additaments, or the intervening of a ſuſpicious *Analyſer*, we receive *Oil*, *acid Spirit*, and *volatile Salt* copiouſly; all which did evidently pre-exiſt. But if the Herbs are perfectly or intirely, *putrified*, little or no *Alcali* can be extracted from them; as neither from rotten or *putrified* Wood; the active *Salts*, by whoſe *Combination* the *Alcali* is produced, being either expired or evaporated.

Next, I am to enquire, how the *Fire* produces this *Alcali*; whether by the *changing* of one ſingle pre-exiſting Principle; or by enabling any among them to make ſo notable an Alteration upon, or in the other? Or, laſtly, whether it is effected by the Union of two, or more active Principles, which thereby become different from what they were before the ſaid *Combination*?

I ſhall not at preſent trouble you with the Reaſons, Experiments, and Obſervations, which have induced me to reject the former, but briefly ſuggeſt thoſe which encourage and diſpoſe me to believe and aſſent to the latter: So that this is my Poſition; That *Alcali Salts* do reſult from the *Combination* or *Union* of the *ſaline* and *ſulphurous Principle*. But whether it is the *volatile* or *acid Salt* which *combines* with the *Oil* or *Sulphur*, is now the Subject of our Enquiry. The enſuing Conſiderations ſeem to determine in Favour of the *Acids*.

Firſt, *Tartar*, which is ſenſibly *acid*, and from which a *volatile Salt* cannot be ſeparated by any commonly known Method, by bare *Calcination* becomes a ſtrong and perfect *Alcali*. *Secondly*, *Nitre*, an undoubted *Acid*, with a ſmall Proportion of *mineral* or *vegetable Sulphur*, is converted into a genuine fiery *Alcali*. *Thirdly*, *Nitre*, which is made by the Affuſion of an *acid Spirit* upon an *Alcali*, may be almoſt totally diſtilled into an *acid Spirit*, there appearing not the leaſt Footſteps of a *volatile Salt*, and ſcarce any of the *Alcali*, out of which it was chiefly produced.

But theſe are very weak and inconſiderable, compared with Arguments which neceſſitate me to believe, that it emerges from the *Union* of the *volatile Salt*, with the *oleaginous* or *ſulphureous* Principle. For,

1. There ſeems to be a great Contrariety between *Acids* and *Alcalies*: Being mixed, they heat, fight, and mortify each other; whatſoever one diſſolves, the other precipitates: Whereas, were the *Salt* of *Alcalies* of a Nature approaching to *Acids*, they would more plainly *unite* without the violent Contention, which uſually enſues.

2. *Alkalies* and *volatile Salts* agree in moſt Properties, excepting their different Degrees of *Gravitation*. They are both *diuretical* and *de-obſtruent*; they both diſſolve *ſulphureous* Bodies; agree in their Contrariety to *Acids*, but mix together quietly without Noiſe, Heat, Ebullition, or imparing each others Virtues, and are eaſily ſeparable; the ſame in Quantity and Quality they were before Mixture.

3. *Tartareous* or *eſſential Salts* of *Vegetables* cannot become *Alcalies*, until their *Acidity* be driven away; during which Operation the *volatile Salts* and *Oil*, uniting, become more ponderous than the *acid*, which before did gravitate more than either of them in their ſeparate State: So that ſuch a *Degree* of *Fire* as will wholly diſſipate the *acid Spirit*, cannot elevate the more ponderous *Alcali*. Not but that, contrary to that, which is commonly aſſerted, the moſt *fixed Alcali* may be ſublimed to a great Height without Additaments, by an intenſe *Degree* of Heat: For, I have frequently reduced a *Pound* thereof unto 3 or 4 *Ounces*, and recovered a conſiderable Proportion which was caught in well contrived Veſſels, ſome Yards above the Crucible, little, if at all, altered from what it was immediately before it ſuffered this *Violence*. Upon this Account chiefly it is that *Soot* yields ſome ſmall Quantity of an *Alcali*, eſpecially that neareſt the *Focus*.

4. *Alcalies* may be divided into *Oil* and *volatile Salt*, by facile and natural Methods of Procedure. I myſelf have many Times effected this in Part: And a very worthy Perſon, in whom I can perfectly confide, aſſured me, he hath frequently reſolved the whole Body of *Alcalies* into the two diſtinct Subſtances of *volatile Salt* and *Oil*, receiving of the latter a ſmall Proportion: Which is alſo confirmed by thoſe Trials I have made on the ſame ſubject.

I could ſuggeſt many more Arguments and Experiments; but theſe being ſufficient, and, I think, indiſſoluble, I proceed to confute the Pretenſions of *acid Salts* to an Intereſt in this new Production. *Firſt*, What concerns *Tartar*, its *Acidity* is driven away in great Quantity before it can become *alcalizate*; and a *volatile Salt* may, to my Knowledge, be by divers Methods ſeparated from it. *Secondly*, As to *Nitre*, though that in *Diſtillation* yields an *acid Spirit*, yet it abounds alſo in *volatile Salt*; as I could demonſtrate from the manner of its Generation, and from irrefragable Experiments. And beſides, perhaps in the Operation of the *Sulphur* on the *acid Salt*, ſuppoſing it ſuch, there is a Comminution of its Parts, and thereby that made a *volatile Salt* which was before *acid*, only Magnitude diſcriminating between them.

No ſenſible Difference *among the* fixed *and* volatile Salts *and* vinous Spirits; *by Dr.* Dan. Cox. *ibid. p.* 154. Vid. Sup. *Sect.* VII. 6.

2. I have aſſerted above, That *alcalizate* or *fixed Salts* extracted out of the *Aſhes* of *Vegetables* do not *differ* from each other; as neither their *vinous Spirits*; yet with this Reſtriction, if they were *highly rectified* or *purified*: And I may add, nor *volatile Salts*, not only of *Vegetables*, but even thoſe yielded by *Animals* or *Minerals*, with the before-mentioned Limitation of due *Purification*.

Firſt, then, I ſay, That *Salts* perfectly *alcalized differ* not from each other in ſenſible, nor (ſo far as I have had Opportunity to enquire) in hidden Properties. It hath been a conſtant and general Perſwaſion, that many *fixed Salts* do retain, ſome at leaſt, the *ſpecifical Properties* of thoſe *Vegetables* out of whoſe Aſhes they were extracted. The *Salt* of *Wormwood* and *Mint* are ſaid to be ſtomachical; that of the greater *Celandine* proper for *Ictericks*; thoſe of *Broom*, *Aſh-keys*, *Elder*, *Beans-ſtalks*, &c. Diuretical; of *Roſemary*, *Sage*, &c. Cephalick; and others (too many now to enumerate) which are thought to be endowed with very different medicinal Properties. I am not very forward to queſtion and quarrel with Opinions and Maxims eſtabliſhed by univerſal Conſent, and confirmed by the Experience of many Ages, unleſs I have ſufficient Reaſon to diſtruſt their Veracity and Validity. In the preſent Caſe, the Perſwaſion of the Antients, and the Poſition which I ſhall endeavour to illuſtrate, though at the firſt Appearance they ſeem diametrically oppoſite, may be eaſily reconciled. I formerly declared, that moſt *Vegetables*, burnt whilſt green or moiſt, and with a ſmothering Fire, yield a kind of *neutral Salt*, which may be called *tartareous*, and ſometimes not improperly *eſſential*, many of them retaining the *vomitive*, *purging*, *ſweating*, *diuretical Opiate*, or other general, and perhaps ſome ſpecifical, Properties, wherewith the *Plants* were ennobled which produced them. Now, whether it is ſome ſmall Quantity of *eſſential Oil*, which mixed with the *ſaline* Principle, renders it ſo variouſly medicinal, the *eſſential Oils* of *Plants* being manifeſtly as it were a Compendium of the Plant, which they do equally exactly reſemble in Smell, Taſte, and other Qualities; or, whether thoſe Vertues are the Reſult of the *Craſis*, and Mixture of the ſeveral Principles; certain I am, that after the *Oil* is evaporated by an intenſe Heat, or the *Craſis* diſturbed by Avolation of ſome Parts, and new Combinations of what remains, farewell all *ſpecifical* Qualities, and conſequently all other *Differences* than what Purity and Impurity, and ſeveral Degrees of Heat may occaſion, ſome being more white and fiery than others. Now ſome *Salts* are much more eaſily deprived of their *acid* and *oily* Parts than others; and in ſome, on the contrary, the *Oil* is of ſo *fixed* a Nature, or rather ſo cloſely combined with the other Principle, that it muſt be a very intenſe Heat which can disjoin them, and thereby reduce the *Salt* to the common Standard or Aggregate of Qualities wherein all *Alcalies* agree.

The induſtrious *Tachenius* does ſomewhere pretend to demonſtrate, that there is a real *Difference* between the *Alcalies* of different *Plants*; which he would prove by the various Effects they have upon a Sublimate diſſolved in common Water. But this is eaſily reſolved by what I before ſuggeſted; as alſo by an eaſy obvious Experiment, which may at any Seaſon in any *Plant* be readily proved. Take what *Wood* or *Plant* you pleaſe, *burn* it *green*; the *Salt* being extracted out of the *Aſhes*, will, according to the different Degrees of Fire whereunto it ſhall ſucceſſively be expoſed, variouſly influence the *Mercurial* Solution, the ſeveral *Precipitates differing* no leſs from each other than when made with the *Salts* of *different Plants*.

This is alſo moſt evident in *Tartar*, which the leſs and more gently it is calcined, the more *Salt* it yields; and, on the contrary, a much ſmaller Proportion, if ſuddenly, and with the higheſt Degrees of Heat. That which is prepared by the former Method, is mild and gentle; its Taſte approaching ſomewhat towards that of *Acids*; whereas the other, which hath paſſed through the Violence of Fire, hath not the leaſt Affinity therewith, and can almoſt as little be endured by the Tongue as a live Coal of actual Fire. And there being very many Degrees of Heat, whereunto the *Tartar* may be ſucceſſively expoſed; according to the ſaid Degrees, the Manner of applying it, Space of Time, and Subſtances employed in the *Calcination*, the Reſult will be different, and produce different Effects: And the very ſame Sort of *Tartar* will oftentimes become ſenſibly *different* upon theſe Methods of Procedure, and produce moſt of the Appearances mentioned by *Tachenius*. And ſometimes ſeveral Parcels of *Tartar*, which ſeem to our Taſte and Eye *calcined* to the ſame Degree, yet the Operations in nice Experiments are frequently various. And to me it doth not ſeem ſo very wonderful, that many Concretes do really *differ*, which to the Senſes appear ſimple and uniform; of which many Cauſes may be aſſigned. A great Number and Variety of Inſtances might be here introduced to clear this Truth, if it were not already ſufficiently known and believed.

But to proceed, where I digreſſed: What I have *aſſerted* is confirmed by the great *Variety* which is moſt viſible in *Pot-aſhes*: Some being highly *alcalizate* are very *hot*; others *cold*, *watry*, *nitrous* to the *Palate*, and no leſs weak in Effects than Taſte; whereof *Soap-boilers*, *Dyers*, and other *Mechanicks* are very ſenſible. All which proceeds from the Woods being, when they are *burnt*, *green* or *dry*, from their abounding with *oily*, *aqueous* or *acetous* Parts, as alſo from the ſeveral Degrees of *Heat* employed in their Production. Thoſe who make *Glaſs*, and eſpecially the finer Sorts thereof, complain, that they cannot with the ſame Quantities and Proportions of Ingredients always produce the ſame Sort of *Glaſs*: Which they, not without Reaſon, aſcribe to the *Differences* in their *Aſhes*. This muſt neceſſarily often happen according to the lately mentioned *Hypotheſis*.

That which hath been ſaid of *alcalizate Salts*, may likewiſe be affirmed concerning *volatile Salts*, and *vinous Spirits*: The former are afforded not only by *Vegetables* and *Animals*, but alſo by ſome *Minerals*: And although immediately upon their Production or *Extraction* out of the ſeveral Subſtances which did yield them, they appear ſenſibly *different* from each other, and are without diſpute endowed with very *different* Properties, chiefly medicinal; yet they may all by ſlight Artifices be reduced into ſuch a *Simplicity* and *Identity*, as that neither the moſt acute and faithful Senſes, nor the moſt rational and nice Experiments, can find or make, without Additaments, the leaſt Diſagreement or *Diſcrimination*. n. 108. p. 169.

Volatile Salts abound in moſt *Vegetables*, from which they ſometimes may be extricated by ſimple *Diſtillation*; but uſually previous *Fermentation* is required: Of which *Operation* I have formerly rendered a particular Account. This *Salt* may be obtained from *Soot*, *Urine*, the *Blood* of *Men* and other *Animals*; from *Bones*, and eſpecially *Craniums* or *Skulls* of *Men*; from many Sorts of *Horns* (and indeed no Subject yields them ſo copiouſly as thoſe which are annually caſt by *Stags* or other *Deer*) from *Vipers* in great Plenty, as alſo from divers other *Animals*. I need not here mention *factitious Salt Armoniack*, that being a Commixture of ſeveral of the mentioned Subſtances with *Sea-Salt*. Alſo many *Minerals* and *Foſſils* contain *volatile Salt*, vaſt Quantities of *Salt Armoniack* being found in many Parts of the *Eaſt*, which was probably *ſublimed* into thoſe Caverns, whence it is extracted, by the Force of *ſubterraneal Fires*: Which Conjecture is ſufficiently authorized by the ſame Subſtances being gathered near the *Crateres* or Mouths of our *European Vulcano's* of *Ætna*, *Hecla*, *Veſuvius*, in *Campis Phlagreis*; in *England* alſo near the Mouth of ſeveral *Coal Mines*, which have been accidentally fired: And of recent Memory, that Torrent of *melted Minerals* which boiled over the *Crucible* (if I may ſo ſpeak) upon the late *Conflagration* in *Sicily*, and poured itſelf into the adjacent Plains. This *liquid Fire*, as it cooled, condenſing, became cruſty at Top, and almoſt every where Stores of *Salts* were *ſublimed* or thruſt forth by the Violence and Fury of the *Heat*. Some of theſe *Salts* reſembled the vulgar *Sea-ſalt*; others *Nitre*; ſome were of an *aluminous* and *vitriolick* Nature; but that which was moſt copious and univerſal, was *Armoniac*; which although much diſcoloured, and rendered very impure in moſt Places by its Union with various *metallick* and *mineral* Particles, yet did chiefly, as the *factitious Salt Armoniac*, conſiſt of *marine* and *volatile*, commonly called *urinous Salts*, as did alſo the fore-mentioned; as many Experiments have informed me, too numerous and tedious to be here inſerted. Beſides thoſe *mineral Subſtances* already mentioned, ſeveral Sorts of *Earth*, *Clays*, and *Marle*, which are fetched from the ſuperficial or cortical Part of the Earth, do contain Store of *volatile Salts*, which appear upon *Diſtillation*: And from ſome of them I myſelf have frequently ſeparated greater Quantities than will be eaſily credited. It would require more Patience in the Reader than the Subject deſerves, ſhould I relate or particularly enumerate the peculiar ſenſible and medicinal Properties, whereby the *Salts* are *diſcriminated*, which the ſeveral forementioned Subſtances do afford. I ſhall therefore at preſent only ſuggeſt, what in my Apprehenſion renders them ſo *multifariouſly different* from each other, and then diſcover, how they may be reduced unto the *ſame common Nature*, and if you pleaſe, being *united*, become an *uniform* and *homogeneous* Subſtance; wherein I may challenge the moſt ſevere Criticks and experienced Chymiſts, to find a greater Variety of Parts and Qualities, than what is abſolutely neceſſary to conſtitute the *Eſſence* and *Definition* of a *volatile Salt* in the *Abſtract*.

Vid. Sup. Sect. VII.

It was long ſince by the famous *Van Helmont* judiciouſly obſerved, and by many Experiments confirmed, that Variety of *Sulphurs* did chiefly *diſ-*

criminate the Species of *mixed* Bodies, and that moſt of the conſiderable *Changes* which were made in or upon them, were occaſioned by ſeparating their own, or ſuperinducing an extraneous *Sulphur*. If this be affirmed of *Sulphur*, a pretended ſimple homogeneous Body, and the 2d *Principle* of the *Chymiſts*, it is denied: But if he intended, as is moſt probable, by *Sulphur* a Subſtance, which, when ſeparated, is uſually inflammable, and doth ordinarily appear in an *oleaginous* Form, I eſteem his Aſſertion very probable and ſpecious.

Let us make a ſhort Reflection on the *Oils* extracted out of *Vegetables* by the Aſſiſtance of common Water, which are as it were a Compendium of the *Vegetables* that afforded them, being eminently and manifeſtly ennobled with moſt of thoſe ſenſible and thoſe more hidden Qualities that did diſcriminate the *Vegetables* whilſt flouriſhing: Whereas their *Salts*, whether *fixed* or *volatile*, their *Waters* and *Earths*, can boaſt of little, which diſcovers whence they proceed, unleſs they retain ſome ſmall Portion of their reſpective *Oils*, whoſe Preſence occaſions thoſe ſlight *Differences*, which *diſcriminate* them from each other; and being therefore deprived, they relapſe into their elementary Simplicity. The ſame happens, as with *fixed*, ſo in *volatile Salts*, which are *different* ſo long as they retain any Mixture of thoſe *Oils* and *Sulphurs*, wherewith the Concrete that afforded them was imbued; from which being freed, they all *agree* in one common *Eſſence*.

Although I could confirm this Poſition by a great Number and Variety of Experiments, I ſhall for the preſent acquieſce in ſome eaſy and obvious Operations, which will ſufficiently manifeſt, that all *volatile Salts*, being freed from adhering *Oils* and *Sulphurs*, become forthwith *homogeneal* and *uniform*.

Take any *volatile Salt*, whether *Vegetable*, *Animal* or *Mineral*, put it into a very tall *Glaſs-body*, or *Bolt-head*, ſublime the *Salt* in *Aſhes*, *B. M.* in a *Lamp-furnace*, or with other equal temperate Heat, and the more remiſs the better. Repeat this Operation twice or thrice: Moſt of the *Oil* remains at the Bottom, or adheres to the Sides of the Veſſels employed; and the *Salts* will not eaſily be *diſtinguiſhed* from each other, agreeing in moſt, if not all, manifeſt Qualities.

But becauſe this Operation will not ſo well ſucceed, unleſs the Veſſels be very conveniently ſhaped, and the Fire exactly regulated by a judicious experienced Artiſt; for, either Skill or due Care being wanting, ſome ſmall Portion of the more ſubtile fugitive *oleaginous* or *ſulphureous* Particles will aſcend with, and infect the *Salts*, which are thereby ſtill in ſome meaſure (if I may ſo ſpeak) *ſpecificated*; I ſhall briefly repreſent a more certain and facile Method of reducing them into one common Nature and Denomination. Pour upon the *volatile Salt* you would *purify*, a convenient Quantity of well *rectified Spirits* of common *Sea-ſalt*. When the *Salt* is ſatiated (which is diſcerned by the ceaſing of the Heat, Ebullition or Commotion) then with a gentle equal Heat abſtract the *Phlegm*, and with it ſome ſmall Quantity of *volatile Salt*, which not being cloſely united, is upon the firſt Acceſſion of Heat preſently diſmiſſed. *Sublime* the remaining dry Subſtance, which will become good *Armoniac Salt.* This being *pulveriſed*, and mixed with equal Parts of a pure and well calcined *alcalizate Salt*, or if you pour thereon a ſtrong *Lixivium* or *Solution* of any perfect *Alcali*, the *alcalizate Salt* combining more cloſely with the *acid* than the *volatile*, this latter will be elevated by a ſmall Degree of Heat, and appears, either immediately, or upon *Rectification*, in the Form of a dry, ſubtile, fugitive *Salt*, perfectly free from the Contagion of *Oils* or *Sulphurs*. And by this common Method of Procedure, all *volatile Salts*, although the Tribes and Concretes that afford them were exceeding different and diſtant, and they alſo diſagree in *ſenſible* and (as they are commonly ſtiled) *occult* Qualities, are brought unto a perfect *Agreement* in ſome few common Properties.

I might add, that whatſoever can be effected by artificial Operations, in order to the *unſpecificating* of *volatile Salts* is more naturally and ſpeedily performed by the *Air*, which is, as I could fully demonſtrate, impregnated with a *volatile Salt*, partly *ſublimed* by *ſubterraneous*, and *extracted* by *celeſtial Fires*; partly expired from *Animals* during their Life; and both from *them* and *Vegetables*, upon the Diſſolution or Diſſociation of their conſtituent Parts in *Arefactions* and *Fermentations*. Theſe *Salts*, being received into the vaſt ſubtile fluid *Expanſe*, are immediately diveſted of their *diſcriminating* Properties, and become the Inſtruments of ſundry remarkable Effects and Operations, not only in natural, but alſo artificial Productions: Which *Salt* may be obtained by ſundry Methods, and out of ſeveral Subſtances, in its pure *Simplicity*; but being once diſſolved in Rain, and Dews, and thereby inſinuated into the Earth, or otherwiſe caught and conveyed into *Vegetables*, they are ſoon *ſpecificated*, and by Union with the other Principles or Corpuſcles of a different Nature, do degenerate, or are exalted, which you pleaſe, and of *ſimple* (at leaſt comparatively) become *compound* Subſtances; yet eaſily again reducible, by Nature or Art, into their Primitive *Simplicity*.

It remains that I ſhould detect the ſame *Identity* or Uniformity of Nature and Properties to reſide in all *highly rectified vinous Spirits*, which we have diſcovered in *Salts* both *fixed* and *volatile*.

That *vinous Spirits* are only (or at leaſt chiefly) the more ſubtle fine *Oils* of *Vegetables*, by *Fermentation* broken into leſſer Particles, and leſs branched than thoſe which conſtitute the *Oils* themſelves, will appear highly probable to him that ſhall duly conſider the Manner of their Production, and ſeems demonſtrable by divers obvious Experiments. For the ſame Quantity of *Vegetables*, which being *diſtilled* with Water, no *Fermentation* preceding yields *Oil* plentifully, and little, if any, *vinous Spirits*; being *diſtilled* after a convenient Time of Digeſtion, and the Addition of ſome proper *Ferment*, they afford Store of *vinous Spirits*, and if fully *fermented*, there is little Appearance of *Oil*. Alſo the ſame *Herb fermented*, after its *Oil* is extricated by the uſual Method, yields a far leſs Proportion of *vinous Spirits*, than when *fermented* before it was deprived of its *Oil*. That Portion of the *Oil*, which is by *Fermentation* divided into leſſer Particles, although, notwithſtanding this Comminution they are (according to the *Carteſian Hypotheſis)* branched enough to continue inflammable, yet being minute, do not affect the Palate after ſuch different Manners, or make upon it ſuch a Variety of Impreſſions, as thoſe that are occaſioned by Impulſes from the more groſs *oleaginous* Particles.

Now, if the ſmaller and more ſubtile Matter, which we ſhall henceforth call *vinous Spirits*, being preſſed by Heat, carry up and convey along with them ſome entire unbroken *oily* Parts, or receive them that are capable of being elevated with the ſame Degree of Heat by which they were raiſed, theſe Mixtures will retain ſomewhat of the moſt remarkable *Differences* in *Taſte*, and ſometimes *Odour*, whereby the *Vegetables* themſelves or their *Oils* were *diſcriminated:* But upon long frequent *Digeſtions*, or reiterated *Diſtillations*, theſe groſs *oleaginous* Particles are either ſubdivided, and thereby become *vinous Spirits*, or that gentle equal Degree of *Heat*, which is ſufficient to elevate the more active *volatile vinous Spirits*, cannot raiſe the more ſluggiſh *Oils:* So that the Reſults are pure ſingle *homogeneous vinous Spirits*, which, whatſoever the *Concretes* were from whence they were derived, though vaſtly *differing* from each other; as alſo their *Oils*, out of which the *vinous Spirits* were more immediately produced; yet the *Spirits* themſelves thus *purified* are, in outward Appearance, *ſimilar*, and perhaps as perfectly ſimple and *homogeneous* as moſt Subſtances in the Univerſe.

What I have delivered is further confirmed by a more viſible palpable Converſion of *vegetable Oils* into *vinous Spirits* which I have effected in many, and, by analogous Operations, I preſume the ſame *Change* may be ſuperinduced upon all. Pour upon an *Ounce* of ſome common *vegetable eſſential Oil* 2 or 3 *Pounds* of *vinous Spirits* perfectly *dephlegmed* (the greater Quantity the more ſpeedy is the *Tranſmutation* or Change performed) the Spirit will immediately, upon ſimple Agitation, abſorb, devour, or diſſolve the *Oil*, which by long *Digeſtion*, or reiterated *Cohobations*, may be totally diveſted of all thoſe peculiar Properties it enjoyed whilſt an *Oil*, and become perfectly *vinous*, never to be *ſeparated* in a diſtinct Form, or by any known diacritical Sign or Artifice, to be *diſcriminated* from what hath, in all Appearance, *converted* or *tranſmuted* it into its own Nature, or at leaſt into a Subſtance ſo like itſelf, as to deſerve the ſame Denomination.

I ſhall here, inſtead of a Concluſion, impart unto you *two* very odd ſurprizing *Experiments*, which have ſome, though remote, Relation unto the preceding Diſcoveries concerning *alcalizate* and *volatile Salts*.

Having procured a great Quantity of *Fern-Aſhes*, I *extracted* their Salt after the common Method with *Water:* Moſt of the *Water* being evaporated, I obtained ſeveral Pounds of *Salt*, the greateſt Part whereof being dried, I expoſed the Remainder unto the *Air*, that it might arreſt ſome of the Vapours fleeting in the ſame, and thereby become fluid; which is commonly, though improperly, ſtiled the *Oil per Deliquium*. The reſt of the *Lixivium* which continued fluid, being *filtred* whilſt warm, was of a very *red Colour*, deeper than that of florid Blood, or of moſt Clarets, and exceeding *ponderous*. The *Colour* argued it abounding with *ſulphureous* or *oily* Parts, and the *Weight*, that it was highly ſatiated with the *ſaline*. Having put this ſtrong Solution into a capacious Glaſs, I either forgot, or neglected it five or ſix Weeks; and then looking after it, my Eyes were unexpectedly ſaluted with a moſt pleaſant Spectacle, which having arreſted, did immediately fix, detain and employ them in the Contemplation of an Object which did at once moſt charmingly invite, and fully requite their greateſt Attention: The *Lixivium* had depoſited a large Portion of the Salt it formerly contained, Part of which ſubſided, I ſuppoſe, immediately upon its Cooling: And, ſeveral Weeks of very cold Weather enſuing, did occaſion the Precipitation of more. So that, according to my Eſtimation, it was at leaſt 2 Inches thick over the Bottom of the Veſſel. The loweſt Part of the Salt was of a *dark Colour*, as if ſome Earth, Dirt or Dregs were admixed therewith. The upper Part or Surface contiguous to the Liquor was exceeding *white*, and there did ariſe or ſpring out of the whole Maſs of Salt, at ſmall Diſtance from each other, ſeveral, I believe 40 Branches, which (abating the Colour) did moſt exactly reſemble that Sort of *Fern* which is ſingle, like *Polypody*, and not branched, ſending out ſeveral Leaves on each Side from one Stem. Their *Magnitudes* were divers, but the *Figures* of all were the ſame, without the leaſt Variation; only ſome emitted more Leaves from the Stem than others; which is alſo uſual in the *natural Fern*. I preſerved theſe *artificial*, regenerated, or reſuſcitated *Vegetables*, many Weeks in the ſame Poſition, not moving them, they being of ſo tender a Fabrick, that the leaſt Motion of the Glaſs did hazard their Diſappearance.

Obſ. 1. The *Fern* was of a middle Conſtitution, between *green* and *dry*, when burnt.

2. It was employed to dry Malt, burnt in a Kiln with a cloſe ſmothering Heat.

3. Therefore the *Aſhes* yielded a far greater Proportion of *Salt* than when the *Herb* is very *dry*, and *incinerated* by a free open Fire.

4. From the ſame Cauſes the *Salt* was not perfectly *alkalizate*, but plainly *tartareous*, and abounded with *Oil* and *acid* Particles; and therefore might properly enough be called an *Eſſential Salt*: And, upon *Fuſion* with a ſtrong Fire, was much changed from a *dark Brown* becoming *white*, and was by the Action of the Fire much leſſened in Bulk, the Conſequence of the Avolation of *Oil*, *Acidities*, and perhaps other Subſtances, during the Operation of ſo ſtrong a Fire.

5. That Part of the *impure Salt*, which, as I before intimated, was ſet to *deliquate*, did not, as is uſual, become *liquid*, but a perfect Gelly, which could not by any Method be afterwards reduced unto its *ſaline* Form; which recalls unto my Mind what is delivered by *Kircher* of his own perſonal Experience in the *Reſuſcitation* of *Plants*, who affirms, that at ſome certain Time of the Operation the prepared *Vegetable* Subſtances appear in ſuch a Form.

The *other Experiment* concerning *volatile Salts*, ſucceeded after this Manner:

Having Occaſion for *volatile urinous Spirits* for ſome ordinary Uſes, I mixed equal Parts of *Sal Armoniac* and *Pot-Aſhes*, which latter had a very ſtrong *ſulphureous* Smell, yet did ſeem to abound with *Salt*, and that conſiderably *alkalized*. The Mixture being put into a tall *glaſs Body*, immediately upon its feeling the Heat, Plenty of *volatile Salt* ſublimed; from which I expected no unuſual Appearance, having often repeated this Operation without obſerving any Circumſtance which deſerved peculiar Attention. Being called from my *Laboratory* juſt as the *Salt* began to appear, at my Return I was amazed to ſee in the *Glaſs Head*, which was, as the *Cucurbit*, very ſpacious, or capacious, a *Foreſt* in *Perſpective*, ſo admirably delineated as not to be excelled, if imitated, by the Pencils of the greateſt Maſters in *Painting*. They were all, not only to my Apprehenſion, but alſo in the Opinion of ſeveral Spectators, ready to atteſt it, *Shadows*, *Rudiments*, *Adumbrations*, or *Repreſentations* of *Firs*, *Pines*, and another Sort of *Tree* which I cannot eaſily deſcribe, nor have I ever ſeen it growing wild, or in Gardens, or in any Herbal exactly repreſented. All theſe *Images*, although very numerous, were reducible to one of theſe *three Species*. I do not remember that I have ever ſeen any more tranſportingly agreeable Appearance in any Chymical Operation; although it is well known that *Chymiſtry* doth daily preſent thoſe who are very converſant with her, a great Number and Variety of Objects, highly diverting for their Prettineſs and Curioſity in *Colour*, *Figure*, and other Accidents.

But to return to the forementioned Operation, I am not ignorant, that *volatile Salts* do conſtantly ſhoot into variouſly and beautifully ſhaped *Chryſtals*, but I could never obſerve them regular, or reducible unto a certain Number of Figures; whereas in the Operation we have deſcribed, the Figures were, *firſt*, very different from any that ever appeared before or ſince upon *Diſtillation* of the Commixture, and *Diſtillation* of *Pot-aſhes* and *Salt Armoniac*, although by me frequently repeated; as neither upon the *Diſtillation* or *Rectification* of *Harts-Horn*, *Blood*, *Urine*, *Cranium Humanum*, *Salt Armoniac* with *Lime*, *Salt* of *Tartar*, and other *Alcalies*. *Secondly*, The Figures were all reducible, in the Apprehenſion of every Spectator, unto *three* Kinds; two of them commonly known. But of this ſo delicious a Spectacle, to my great Grief, I was ſoon deprived by the *Sublimation* of more *Salt*, which filling up the Interſtices, did, together with the former, caſe the Glaſs, and retained no other Figure than the Concavity thereof allowed of.

The next Day that great Virtuoſo Sir *Rob. Murray* (whoſe Memory can never be too much cheriſhed, nor his Loſs ſufficiently bewailed) honouring me with a Viſit, I acquainted him with the lately recited Accident; who ſcrupled not, though a rigid Philoſopher, to credit my Relation, and to confirm me in the Belief, that ſome certain governing

ing Principle might contribute towards the Production of this Phænomenon.

He affirmed, that one *Daviſon*, a famous and experienced *Chymiſt* at *Paris*, had frequently ſhewed him in a Glaſs a great Company of *Firs* and *Pines*, which ſeemed no leſs lively and accurate, than thoſe produced by Painters are; but ſuch Suſpicions were ſoon ſtifled by their ſpeedy Diſappearance and Reproduction. He alſo referred me unto his Book of *Chymical Operations*, where I find he makes mention of it as a great Artifice, as really it was, and makes it no leſs a Myſtery by concealing the Proceſs or Materials, whereby it may be effected; only that nothing was employed beſides Subſtances afforded by the *Trees* which were repreſented; and that the chief Ingredient was *Turpentine*. Herein his Operation differed from that which I lately recited; in that the Subſtance, out of which *he* raiſed thoſe Shapes, was of a more fixed Nature; that which afforded *mine*, *volatile* to the higheſt Degree: *He* could conſtantly and regularly produce theſe Figures; but *mine* did unexpectedly and fortuitouſly repreſent themſelves unto my View; neither do I ever again expect the like Appearance; nor will I contend with him that ſhall affirm it was a meer Phantaſm, or a *fortuitous Coalition* of *Salts* into ſuch pretty *Figures*.

Vegetable Salts *extracted; by S. Fr.* Redi. *n.* 243. *p.* 281.

IX. 1. *Burn* any Sort of *Herb*, *Flower*, *Fruit*, *Wood*, or whatever it be, and make *Aſhes* thereof; with the *Aſhes*, and with pure *Water*, in its natural Temper, make the *Lye*, which after ſtrain through moiſt Paper, or a Filter, ſo that it becomes as clear as poſſible. Afterwards put the *Lye* into a Glaſs Veſſel, and let it remain in *Balneo Mariæ* until ſuch Time as a great Part of it *evaporates*, according to the Proportion obſerved by thoſe that are uſed to ſuch Operations, and according as the *Congelation* of the *Salt* is deſired to be more or leſs expedited or retarded.

2. If you keep the *Lye* to *evaporate* by the *Fire* in Veſſels of *Earth* glazed, you will loſe a great Quantity of the *Salts*, for that as the *Lye* grows thicker, the *Salt* penetrates the Bottom and Sides of the Veſſels of *Earth*, and is loſt.

3. The Quantity of Water to make the *Lye* of is not determined; for the moſt Part 5 ℔ of *Water* will extract all the *Salt* from 2 ℔ of *Aſhes*.

4. The *Aſhes*, whereof we have already made the *Lye*, and by Conſequence drawn out the *Salt*, may, if you *burn* the ſame again in a Brick Furnace, make you afterwards another new *Lye*, which uſually yields ſome ſmall Portion of *Salt*.

5. The *Salts* drawn in the Manner aforeſaid, when the *Air* is moiſt, uſe to *melt*: To obviate this Inconvenience, when you burn the Materials to reduce them to *Aſhes*, it is requiſite to uſe with them a due Quantity of *Sulphur*; and if it happen the *Aſhes* ſhould be made to your Hand, you may mingle them with *Sulphur*; and keep the ſame to the Fire till ſuch Time as it be *burnt*. By this Means the *Salt* will never come to *run*, but become more *white* and *chryſtalline*.

6. There is no general Rule concerning the Quantity of *Sulphur* to be put into the Materials you thus *burn:* You may nevertheleſs at a Gueſs ſay, to 100 ℔ of Materials 4 or 5 ℥ of *Sulphur* are uſually ſufficient.

7. All the *Salts* have a peculiar and *determined Figure,* the which they always keep, although they are often reſolved into Water, and afterward congealed.

8. If in one only Liquid you diſſolve together 2 or 3 Sorts of *Salts* of *different Figure,* when they congeal they all aſſume their antient and *proper Figure,* and this not only happens in *factitious,* but alſo in *mineral Salts.* If in a Veſſel full of Water you *diſſolve* equal or unequal Quantities of *Vitriol* of *Cyprus, Roch Allum,* and of purified *Nitre,* this Water will be all of an *Azure Colour:* But when the Water is *evaporated,* you will ſee in the Veſſel, that the *Vitriol,* the *Allum* and the *Nitre* have re-aſſumed diſtinctly their firſt *natural Figures,* and that the *Vitriol* hath recovered its moſt compleat *Azure Colour,* leaving the *Nitre* and the *Allum* with their uſual tranſparent *Whiteneſs.*

9. Although it be ſaid before (N. 7.) that all *Salts* have a *proper* and *particular Figure,* yet notwithſtanding all this, I have obſerved, that ſome Manner of *Salts* have 2, 3 and 4 Sorts of *Figures. Two Sorts* have been ſeen in *Lettice,* in the *Scorzonera's,* in the *Muſk Melon,* the *Scopa,* in the *Roots* of *Eſula,* in the *Black Hellebore,* in *Endive,* in *Eye-bright,* in *Wormwood,* in *Sorrel,* and in *Shoots* of *Vines*; *Three Sorts* in *Black Pepper,* and in *incarnate Roſes*; *Four Sorts* in the *Roots* of *White Hellebore.*

10. Beſides the before-mentioned *Diverſity* of *Figures* which are found in *Salts,* I have obſerved, that among all *Salts,* of whatſoever *Figure,* there are found ſome *cubical*; which, though they be never ſo often diſſolved and congealed, appear ſtill of a *cubical Figure,* or enclining to it.

11. *S. Redi* knows not that it is a general Rule, That the different Parts of *Herbs, Fruits,* &c. make *Diverſity* in the *Figure* of their *Salts*; but he ſays particularly, That the *Salts* of the *Leaves* of *Lawrel* differ from that of the *Wood,* and that the *Figure* of the *Salt* of the *Pulp* of a *Gourd* differs from that of the *Rind.*

12. Many *Salts* of different Matter have the *ſame Figure,* or at leaſt very like. The *Salt* of *Cucumber* hath a Figure like the *Salt* of *Eye-bright, Mechoacan, Scopa* and *Lettice*; alſo all the *Salt* of *Orange-Flowers, Roſes, Ginger, Endive, Colloquintida, Scorzonera-Root, White Hellebore Roots* and *Liquoriſh,* are all like one another: *Coleworts* and *Roſemary-Flowers* give a *Salt* of one and the *ſame Figure,* as likewiſe do among themſelves *Vine-Branches, Sorrel, Black-Pepper,* the *Rind* of *Pomegranates* and the *Roots* of *Black Hellebore.*

13. To make the Bodies of the *Salts,* when they congeal, reſt *diſtinct* one from another (ſo as their *Figures* may be obſerved) and not to be entangled and heaped together, 'tis neceſſary, he ſays, that very great Diligence be uſed in evaporating the *Lye:* For if that be wholly evaporated, or if too great a Part thereof, the *Salts* make a confuſed Cruſt at the Bot-

tom of the Veſſel; if the *Lyes* are left too weak, the *Salts* require a very long Time to congeal in; it is requiſite therefore to uſe ſuch a Diligence which is not to be gained without long Practice. The Inſtruments for meaſuring the *Weights* of *Liquids* may give a Rule, which if it be not general, will at leaſt come very near it. The *Lyes* being reduced to a convenient Thickneſs, are put into little ſmall Glaſſes cloſed with a Stopple and kept in a very dry Place, and you muſt expect by the Benefit of Time, that the *Salts* will congeal themſelves into *Chryſtalline Stones*, either in the Bottom, or on the Sides of the Veſſel.

14. Not all *Herbs*, nor *Flowers*, nor *Fruits*, nor *Woods*, when they are *burnt*, render equally the ſame Quantity of *Salt*, but, according to the Diverſity of their Species, the Quantity of *Salt* which is drawn from their *Aſhes* is found different. The Seaſons wherein the *Plants* are gathered make a great Diverſity; as alſo does the Country, whether Mountainous, or Champaine, or Sea-Coaſt, or Marſhy, or Moiſt.

15. All Matters *burnt* give not the ſame Quantity of *Aſhes*. But there is a great Diverſity, which you may ſee by the following *Proofs*; the greateſt Part in the *Year* 1660.

Vegetables.		*Aſhes.*			*Salts.*		*Aſhes* from 100 ℔ of *Vegetables.*					*Salts* from 1 ℔ of *Aſhes.*			
	℔	℔	℥	ʒ	℥	ʒ	℔	℥	ʒ	℈	gr.	℥	ʒ	℈	gr.
Dried *Flowers* of *Oranges*	100	4	6	0	0	5	4	6	0	0	0	0	1	0	8
Gourds new gathered (which dried in the Oven were 36 ℔)	800	4	0	0	10	0	0	6	0	0	0	2	4	0	0
Red Onions (being 720) roaſted, the Coals burned to 16℔; to the Coals were added 4 ℥ of *Sulphur*	400	1	6	0	2	2	0	4	4	0	0	0	7	1	0
Eye-bright freſh, and afterwards ſtilled and burnt	150	5	0	0	4	0	3	4	0	0	0	1	1	1	9
Diſtilled *Roſes*	120	4	0	1	0	4	3	4	0	0	0	3	0	0	0
Maidenhair	100	9	0	0			9	0	0	0	0	0	0	1	8
Roots of *Black Hellebore*, which dried came to 50 ℔	150	6	0	0	1	0	4	0	0	0	0	0	0	4	0
Roots of *White Hellebore* freſh, which dried came to 50℔	150	2	0	0	4	0	1	4	0	0	0	1	0	0	0
Roots dried and burnt of freſh *Eſula*	96	3	0	0	2	0	3	1	4	0	0				
Roots of *Liquoriſh*	30	2	0	0	1	4	6	8	0	0	0	0	6	0	0
Pellitory	20	1	0	0	0	6	5	0	0	0	0	0	6	0	0
Green Endive	100	2	0	0	2	0	2	0	0	0	0	1	0	0	0
Green Bindweed	90	1	0	0	2	0	1	1	2	2	0	2	0	0	0
Leaves of *Lawrel*	2000	33	0	4	0	0	1	2	0	0	0	0	3	1	22
Leaves of *Lawrel*	500	6	0	0	10	0	1	7	4	2	10	1	5	1	6
Water Melons well ripe, the *Seeds* being taken	1000	25	0	1	0	9	2	6	0	0	0	0	6	1	11
Cucumbers	2400	18	0	0	0	0	0	9	0	0	0				
Wood of *Ivy*	300	9	0	0	0	0	3	0	0	0	0				
Scorzonera dried	50	8	0	0	0	0	16	0	0	0	0				
Pine Apples, the *Nuts* taken out	300	3	0	0	0	0	1	0	0	0	0				
Mugwort dried	150	8	0	0	0	0	5	4	0	0	0				
Leaves of *Cypreſs*	130	6	0	0	0	0	4	7	3	5	0				
Peel of *Pomegranates* dried	10	1	8	0	0	0	6	8	0	0	0				
Saſſafras	2	1	0	0	0	0	3.	1	4	0	0				
Lignum Sanctum	12	2	6	0	0	0	20	10	0	0	0				
Yellow Sanders	4	1	1	4	0	0	1	0	4	0	0				
Black Pepper	4	1	2	4	0	0	5	2	4	0	0				
Ginger	30	1	7	0	0	0	5	3	2	2	0				
Turbith	12	1	0	0	0	0	8	4	0	0	0				
Wood of *Fir*		3	0	0	3	0						1	0	0	0
Scopæ		16	0	1	4	0						1	0	0	0
Scopæ		16	0	1	6	0						1	1	0	0
Wheat-Flour							2	2	5	1	0				

Heads of old *Garlick* 32 ℔ were dried in a Furnace and *burnt*; from the *Aſhes* there was hardly any *Salt* to be gathered.

Thirty Pounds of *Wheat-flour burnt* in a *Furnace* with a little *Sulphur*, and *burnt* a-new in a Potter's Oven, gave 8 ℥ of very black *Aſhes*, the which being baked again for 8 Days continually in a Brick Furnace, after the *Lye* was made, there could not be a *Grain* of *Salt* drawn. The like happened in 10 ℥ of *Aſhes* drawn from a *Stare* and a *half* of Bran, *burnt* firſt in the Furnace with *Sulphur*, and afterwards baked in a Potter's Oven, and in one of Bricks.

16. All the *Salts* whatever drawn from the *Aſhes* of *Vegetables*, taken by the Mouth, ſays he, have a *purging* Faculty, and in a great Meaſure more than what by ſome is believed in *common Salt*, which taken by the Mouth has little or none at all; or if it have any, betwixt that of *common Salt* and *Vegetables*, the Proportion is but as *two* to *eight*.

17. This *ſolutive* Faculty is of equal Energy in all the *Salts*, in ſuch manner that the *Salt* of *Sumach*, *Peels* of *Pomegranates*, *Myrtle Berries*, or *Maſtick*, *purges* as much as the *Salt* of *Rhubarb*, *Sena*, *Turbith*, *Mechoacan*, and all other like *purgative Drugs*.

18. The *Doſe* to be uſed is the ſame in all the *Salts*, to wit, from 2 *Drachms* and a *half* to *half* an *Ounce* diſſolved in 6 *Ounces* of common Water and Broth: He has obſerved by infinite Experiments, that *half* an *Ounce* uſes to *purge* 3 ℔ and a *half*, or 4, or thereabouts of Matter, more or leſs, according to the Complexions, and according to the Fulneſs of the Bodies.

19. In the *Purging* he has found no *Difference* betwixt theſe *Salts* that have ſharp Points, and thoſe that are obtuſe and blunt, or *cubical*: He has made Proof very often in divers Perſons, cauſing the like *cubical Stones* of *Cucumbers*, *Ginger*, *Colewort*, and of *Liquoriſh*, to be picked out, and he has ſeen that they have *worked* with the ſame Energy as the moſt acute *Hexagon-Stones* of the *Salt* of *Pepper*, of *Carnation-Roſes*, of *Mechoacan*, of *Coleworts*, of *Cucumbers*, &c.

20. From the aforeſaid Obſervations, though you cannot eſtabliſh a certain Rule, you may nevertheleſs conjecture, not without ſome Reaſon, *Firſt*, that the *Salts* drawn from the *Aſhes* of *Herbs*, *Flowers* and of *Fruits*, &c. do not conſerve the Virtue, and that Faculty which Phyſicians believe the *Herbs*, *Flowers*, *Fruits*, &c. endowed with. *Secondly*, You may very near be certain of the Proportion of *Aſhes* riſing from each Species of *Vegetables*, and of the Quantity of *Salt* which is afterwards to be drawn from them.

21. You may alſo obſerve that ſome *Vegetables* inſipid and cold, as *Endive*, *Pompion* and *Roſes*, have given much more *Salt* than others of a ſtronger Savour, aperitive and inciſive, as the *Onions*, *Hellebore*, *Lawrel*, *Maiden-Hair* and *Garlick*; which is ſo ſtrong, gives none at all: But it may perchance be ſaid, that in theſe there is a greater Quantity of *volatile Salt*.

X. M.

To find the exact Quantity *of* volatile acid Salts *contained in* acid Spirits; *by M.* Homberg. *n.* 262. *p.* 532.

Vid. Vol. I. *Cap.* VI. *Sect.* VI. 2. & *S.* VI.

X. M. *Homberg*, in a Diſcourſe at a Meeting of the *Royal Academy* concerning the *Quantity* of *volatile acid Salts* contained in *acid Liquors*, told us, That the *acid Spirits* were no other thing but a *Salt* diſſolved by a little Water, which the Taſte ſhews well enough for an *Acid*, as alſo its Effects. He calls it *Volatile*, becauſe it is raiſed by the Fire with the *Phlegm*, and it cannot be but hardly ſeparated from that, and reduced into a dry Form: That nevertheleſs M. *Homberg* has made in the Operation inſerted in the *Memoirs* of the *R. Academy*, publiſhed the 15th of *Dec.* 1692, by what Operation it appears that the *acid Spirits* are nothing but *volatile Salt* and *Phlegm*. The *Quantity* of *Salt* contained in a determined Quantity of *acid Spirit* was not yet known, but he has given a Way to know it, and alſo he may ſay the *Quantity* of *Salt* contained in whatever *acid Spirit*, only by the *Weight* of *Volume* compared with the *Weight* of another *Spirit*, of which the *Quantity* of *Salt* contained in it was known. *Firſt*, for knowing the *Quantity* of *volatile acid Salt* contained in ſome *acid Spirits*, he has poured upon an *Ounce* of *Salt* of *Tartar* well dried, the *Quantity* of an *acid Spirit*, as much as the *Salt* of *Tartar* has been able to take of it; then he evaporated all the inſipid Humidity or *Phlegma* out of this *Salt*, and he *weighed* the Matter: The *Quantity* of his *Weight* above the *Weight* of the *Salt* of *Tartar* before *Saturation* is the *Quantity* of *acid volatile Salt* contained in the *Quantity* of *acid Spirit* which has been taken by one *Ounce* of *Salt* of *Tartar*. Here is the Table of the *Quantity* of *Acid* that has been neceſſary to the perfect Impregnation and Fulneſs of the *Salt* of *Tartar*, and by the ſame Means the Table of the *Quantity* of *acid volatile Salt* contained in one *Ounce* of ſeveral *acid Spirits*.

For the perfect Impregnation of one *Ounce* of *Salt* of *Tartar* was poured upon it *Spirit* of *Nitre* ℥j, ʒij, *Gr.* xxxj, the *Weight* of that *Salt* after the Evaporation of the inſipid Humidity has been encreaſed to ʒiij, *Gr.* x, above *one Ounce*; that Encreaſe coming from the *Acid* retained in the *Salt* of *Tartar*, ſhews to us that *one Ounce* of *Spirit* of *Nitre* contains ʒij, *Gr.* xviij of *acid Salts*.

So for the Impregnation of ℥j of *Salt* of *Tartar*, has been poured upon it *Spirit* of *Salt* ℥ij, ʒv; the Encreaſe after the Evaporation has been found ʒiij, *Gr.* xiv; and therefore *one Ounce* of *Spirit* of *Salt* contains ℥j, *Gr.* xv of *acid Salt*.

Upon ℥j of *Salt* of *Tartar* has been poured *Oil* of *Vitriol* ʒv, the Encreaſe has been found ʒiij, *Gr.* v; therefore ℥j of *Oil* of *Vitriol* contains ʒiij, *Gr.* lxv of *acid Salt*.

Upon ℥j of *Salt* of *Tartar* has been poured *Aquafortis* ℥j, ʒij, *Gr.* xxx; the Encreaſe has been found ʒiij, *Gr.* vj; therefore ℥j of *Aquafortis* contains ʒij, *Gr.* xxvj of *acid Salt*.

Upon ℥j of *Salt* of *Tartar* has been poured *diſtilled Vinegar* ℥xiiij; the Encreaſe has been found of ʒiij, *Gr.* xxxvj; therefore ℥j of *diſtilled Vinegar* contains *Gr.* xviij of *acid Salt*.

It appears by this *Table*, that the *Quantity* of *acid Salt* for ſaturating the *Salt* of *Tartar*, is near the ſame, though the *Quantity* of *acid Liquors* ſhould be very different: 'Tis only the *Acid* of *Vinegar* of which the *Salt* of *Tartar* retains more than it does of the others, that M. *Homberg* attributes to the Subtility of the Particles of the *vegetable Acid*, which have been very much divided by the Alterations in the *Fermentation* of the Liquors in the *Plants*, &c. of the *Wine*, and alſo in the *Diſtillation*; which Alterations the *Mineral Acid* has not received. The *vegetable Acid*, by that Subtility of Particle, is able to impregnate a greater Quantity of Liquor than the ſame Quantity of *mineral Acid*, and by that it is more eaſily raiſed up by the Fire than the others.

By theſe Obſervations, M. *Homberg* makes evident the Reaſon of ſome Caſes difficult to be explain'd without them: As 'tis well known *one Ounce* of *Aqua Regia*, compounded with the *Spirit* of *Nitre*, and the *Armoniac Salt* diſſolves *twice* more *Gold* than *one Ounce* of the *Spirit* of *Salt* can do. The *Chymiſts* attribute that Effect to the Softneſs of the Points of one *Acid*, and to the Hardneſs of the other: When theſe Obſervations make evident, that the *Spirit* of *Nitre* contains twice more of *acid Salt* than the like *Volume* of *Spirit* of *Salt*, and open in the ſame time the true Cauſe of this Effect.

M. *Homberg* diſcourſed alſo how we may know the *Quantity* of *acid Salt* contained in an *acid Spirit*; which he doth in the following manner: He takes an *acid Spirit* (as *Spirit* of *Nitre*) he *weighs* it by his *Areometer*, and at the ſame time he *weighs* alſo *diſtilled Water* (for the *Weight* of the *Phlegm* contained in the *acid Spirits* is like as the *Weight* of the *diſtilled Water*) then he looks for the *Bulk* of *Spirit* of *Nitre*, compared with a like *Bulk* of *diſtilled Water*, which has given a certain Quantity of *acid Salt* for each *Ounce*; and from thence he concludes, that the *Bulk* of the other *Spirit* of *Nitre*, of which the *Weight* is known, compared with the like *Bulk* of *Water*, ſhall give a determined *Quantity* of *acid Salt*, which will be raiſed by the Computations of the Relations of the *Weights* of thoſe *Spirits* with the *Weights* of the like *Bulks* of *diſtilled Water*, by concluding from them, and from the *known Product* of *acid Salt*, for the *unknown Product* of the ſame.

Four Sorts of factitious ſhining Subſtances; *by Mr.* Oldenburg. *n.* 135. *p.* 867.

XI. I have received Accounts of four ſorts of *factitious ſhining Subſtances*, 1*ſt*. A *factitious Paſte* of Dr. *Baldwin*, ſhining in the Dark like a glowing Coal, after it hath been a while expoſed to the *Day* or *Candle-Light*. Another is the *Bononian Stone* calcined, which imbibes Light from the *Sun-Beams*, and ſo renders it again in the Dark, whereas the former needs no ſhining Sun, but doth the Effect in quite over-caſt Weather, and even in a miſty Day. The 3d, is by the *Germans* called *Phoſphorus Smaragdinus*, ſaid to be of this Nature, that it collects its Light not ſo much from the *Sun-Beams*, or the illuminated Air, as from the *Fire* itſelf; ſeeing that, if ſome of it be laid on a Silver or Copper-plate, under which are put ſome live Coals, or a lighted Taper, it will preſently ſhine; and if the ſame Matter be ſhaped into Letters, one is able to read it. The 4th is called *Phoſpho-*

rus Fulgurans, which is a Matter made both in a liquid and dry Form; and not only ſhineth in the Dark, and communicates a ſudden Light to ſuch Bodies as it is rubbed upon, but being included in a Glaſs Veſſel well cloſed, doth now and then *fulgurate*, and ſometimes alſo raiſe it ſelf as it were into Waves of Light; differing very much from the *Baldwinian* Stone, which is to be expoſed to ſome ſhining Body, as the *Day*, the *Sun*, the *Fire*, or ſome *lighted Candle* to receive Light from thence; whereas this *fulgurating* Subſtance carries its Light always with it, and when put in a dark Place, preſently ſhews the ſame; of which we have this further Aſſurance given us, that a little Portion of it having been kept two whole Years, hath not yet loſt its Power of *Shining:* So that it is believed, if a conſiderably big Piece were prepared for it, it would ſerve for a *perpetual*, or at leaſt a very *long-laſting Light*.

The Bononian Phoſphore *loſt; by* —— *n.* 21. *p.* 375.

XII. 1. Though ſeveral Perſons have pretended to know the Art of Preparing and Calcining the *Bononian Stone*, for keeping a while the Light once imbibed; yet there hath been indeed but one who had the true Secret of performing it: This was an *Eccleſiaſtick*, who is now dead, without having left that Skill of his to any one.

Statues *of the* Bononian Stone; *n.* 134. *p.* 842.

2. S. *Malpighi* takes notice, that one S. *Zagonius* had a way of making out of the *Bononian Stone* calcin'd, *Statues* and *Pictures*, variouſly *ſhining* in the *Dark*. But he adds (to our Sorrow) that that Perſon lately died, without diſcovering to any body his Method of Preparing it.

A Phoſphorus; *by Mr.* Robert Boyle. *n.* 196. *p.* 583.

XIII. *Septemb.* 30, 1680, there was taken a conſiderable Quantity of *Man's Urine* (becauſe the Liquor yields but a ſmall Proportion of the deſired Quinteſſence) and of this a good part at leaſt had been for a pretty while digeſted before it was uſed. Then this Liquor was *diſtilled* with a moderate Heat, till the *ſpirituous* and *ſaline* Parts were drawn off; after which the ſuperfluous Moiſture alſo was abſtracted (or evaporated away) till the remaining Subſtance was brought to the Conſiſtence of a ſomewhat thick Syrup, or a thin Extract. This done, it was well incorporated with thrice its Weight of fine *white Sand*; and the Mixture being put into a ſtrong *Stone Retort*, to which a large *Receiver* (in good part filled with *Water*) was ſo joined, that the Noſe of the *Retort* did almoſt touch the *Water*. Then the two Veſſels being carefully luted together, a naked Fire was gradually adminiſtred for 5 or 6 Hours, that all that was either *Phlegmatick* or *Volatile* might come over firſt. When this was done, the Fire was increaſed, and at length for 5 or 6 Hours made as ſtrong and intenſe as the *Furnace* (which was not bad) was capable of giving (which *Violence* of *Fire* is a Circumſtance not to be omitted in this Operation.) By this means there came over good Store of *white Fumes*, almoſt like thoſe which appear in the *Diſtillation* of the *Oil* of *Vitriol*; and when thoſe *Fumes* were paſs'd, and the *Receiver* grew clear, they were after a while ſucceeded by another ſort, that ſeemed in the *Receiver* to give a faint bluiſh *Light*, almoſt like that of little burning Matches dipp'd in *Sulphur*. And laſt of all, the *Fire* being very *vehement*, there paſſed over another Subſtance that was judged more *ponderous* than the former, becauſe it fell through the *Water* to the Bottom of the *Receiver*; whence being taken out (and partly even while it ſtayed there) it appeared by ſeveral Effects, and other *Phænomena*, to be ſuch a Kind of Subſtance as we deſired and expected.

An Account of Dr. Kunkelius's Phoſphores; *by* Joh. Chr. Sturmius. *Ph. Col. n.* 2. *p.* 9.

XIV. Dr. *Kunkelius* prepares out of the *condenſed Light* (which by his Skill in *Chymiſtry* he knows how to extract out of any Kind of Terreſtrial Body whatſoever, as if it were there naturally placed) certain *Pills* about the Bigneſs of Peas (to which he aſcribes very ſtrange comforting and *medicinal* Virtues) theſe being moiſtened a little, and in the *Dark* ſcraped with one's Nail, Knife or the like, do yield a very conſiderable *Light*, not without a conſpicuous *Smoak* alſo; which afford a *Light* yet much more pleaſant and ſtrange, if about 8 or 10 of them be put into a Glaſs of Water, and therewith ſhook in the *Dark*; for thereby all the Water and the Cavity of the Glaſs will ſeem perfectly filled with Light, flaſhing by turns very briſkly; as I myſelf, not without the Admiration of the Spectators, have ſeveral times experimented. The ſame Dr. *Kunkelius* hath alſo reduced the ſame *lucid* Matter into the Form of larger *Stones* (which I have not yet had the good Fortune to ſee myſelf) which being *warmed* by the *Hand*, but eſpecially if there be a little ſcraped, or rubbed upon a Paper or Table, deſcribes Letters very legible in the *Dark*.

Experiments with the liquid *and* ſolid Phoſphorus; *by Dr.* Fred. Slare. *Ph. Col. n.* 3. *p.* 48.

XV. 1. The *liquid* and *ſolid Phoſphorus* do not materially differ, being made both out of Subſtances taken from a human Body. The *Liquid* is a Subſtance mixed with a Liquor that (though it would burn a Body when in a *ſolid* Maſs) will not offend a Lady's Hand with Scalding, or even Heat, when waſhed in it. An Experiment of this Kind I made this laſt Week, in the Preſence of ſeveral Perſons of very great Quality, where a very learned and ingenious Perſon, waſhing both his Hands and Face with it, made not only his own Face to *ſhine*, but the Luſtre of his Face diſcovered 3 or 4 other Faces not far diſtant: Yet ſo ſoon as the Candles were brought into the Room, the *Shining* diſappeared, and no Sign or Change was perceiveable on the Skin of either.

This *Phoſphorus* continues not its *Light* very long, if cloſe ſtopped: Yet in one Sort I have obſerved a Kind of *Flaſhing* 6 or 7 times ſucceſſively, though the Glaſs were cloſely ſtopped; which makes me conclude it to be the ſame with the *Phoſphorus Fulgurans* of Dr. *Elſholt*, the *Flaſhings* of it having ſome Reſemblance to *Lightning*.

The other *Phoſphorus* which is *ſolid*, differs not, as I ſaid, materially from the *Fluid*, being made for the moſt Part out of *Urine*: But I am ſufficiently ſatiſfied that it may be as well made out of *Blood*, if it could as eaſily be obtained as *Urine* in great Quantities, ſince *Urine* is but the *Serum* of *Blood* ſtrained through the *Kidneys*.

In this Preparation we have not only the common *Analyſis* into *Waters*, *Spirits*, *volatile Salts*, *Sulphurs*, or *Oils*, but divers other extraordinary Appearances before this grand Product comes.

The Subſtance of this *Phoſphorus* may be made as *tranſparent* as any reſinous Body, and will *melt* like Wax in warm Water: And when cold, it is exceeding tough, and cuts like *Luna Cornea*, or rather ſomewhat harder. When it is all under, or covered with *Water*, it *ceaſes* to *ſhine*; but whenever any Part of it chances to emerge or get into the *Air*, though the Glaſs be hermetically ſealed or perfectly ſhut, yet it will *ſhine*.

In a large Glaſs I have kept it without Water for ſeveral Days, and yet continually *ſhining* with little or no Diminution of its *Light* or *Weight*.

Of this *Solid* I have had ſome Parcels much more vigorous and inflammable than others. When I made ſome Experiments laſt Summer with this *ſolid Phoſphorus*, every one handled it without any Danger: But I have ſince had ſome Percels that would ſcarce endure the Touch of a warm Hand without taking *fire* and *burning*. Such Miſchances have happened to ſeveral, that extorted this Curioſity out of my Hand, who would not believe ſuch a cold Body would of itſelf turn into ſo fierce a *Fire*. Thus making ſome Experiments in the Company of a very worthy and ingenious Gentleman, I laid down a Piece of this *luminous* Subſtance (about 2 *Drachms* in Weight) and it took *Fire* when no Candle was in the Room, and we were all at a good Diſtance, and it blazed like a Faggot, and burnt the Carpet and Board it lay upon. This Sort is only for the Experienced and Careful to meddle with.

The leſs vigorous, as I was ſpeaking of, did afford us this Experiment: We writ with a pointed End, what Words we pleaſed in the *Light*, and then we removed into the *Dark*, and had very radiant and *legible* Characters, which looked like Words written with a Beam of *Light*: I have made this continue ſo for a conſiderable Time, by laying it on with Advantage.

If we carry theſe glorious Letters to the *Fire*-ſide, and ſuffer them there to grow warm, they will preſently turn into *dark Lines*, and remain as long as good Ink may be thought to do.

This *Light* is very diffuſive of itſelf, for I have marked down above 100 Characters with this illuſtrious Pencil, and found not a 20th Part conſumed.

In like manner I weighed out half a *Grain*, and ſpread it over my Hand at Night, which it gilded all over, and continued *light* all the Night, for ſo I found it next Morning.

As a further Proof of its diffuſive Quality, having weighed out one *Grain*, and counterpoiſed it in good Scales, it continued to *flame* in the open Air for 7 or 8 Days, in ſo much, as ſhutting my Study Windows by Day, I could always ſee a Bead of *Fire*, and when I looked intent upon it, it ſent up a *white Flame* into the ambient Air; which a large Piece does very remarkably.

After all was burnt out, we had no *Aſhes* or Recrements, ſave only a little Moiſture, which taſted *ſubacid.* Having ſuffered a larger Piece to burn out, I had more Moiſture, which taſted like a weaker *Oleum Sulphuris per Campanam.* This puts me in Mind, that moſt of my Friends, when they have ſeen this Experiment, are apt to call its Fume *ſulphureous,* and truly in all its Properties it ſeems rather referable to *Sulphur* than *ſaline* Concretes, upon the Score of its *Inflammability,* as well as for this Reaſon, that it neither loſes nor is diſſolved in *Water.*

What *medicinal* Uſe may be made of this noble Concrete, Time may diſcover. This I am ſure, that the learned *Willis* (were he alive) would rejoice to ſee ſuch a Product out of our Bodies, who was very confident of ſomething igneous, or flammeous, or very analogous to *Fire,* that did kindle and impregnate our *Blood.* Nor does the ingenious Dr. *Lower* diſallow ſuch an *Hypotheſis,* though he ſuppoſes an *Accenſion* of the *Blood* rather in the *Lungs* than in the *Heart.*

What Service this may do, in helping us to explain other *Phænomena* of Nature, I ſhould be glad to know, particularly, as to that Obſervation of the learned Dr. *Croon,* who, upon rubbing of his Body with a freſh and well-warmed Shift, has made both to *ſhine*; and alſo that of a worthy *Briſtol* Gentleman, who together with his Son told me, that after much walking, both their Stockings will frequently *ſhine.*

Ph. Col. n. 4. *p.* 84.

2. 1. In order to try the *Elaſticity* of this *ſhining* Subſtance when brought to a *Flame,* I made the following Experiment. I conveyed a Quantity of it into a ſmall *Bubble* of *Glaſs,* as big as a Nutmeg (but blown very thin in the Flame of a Lamp, that ſo it might be the more ſenſible of the *Elaſticity* of the Subſtance expanding into *Flame)* then I hermetically ſealed up the End of the Stem of this *Glaſs Bubble,* ſo that no *Air,* nor any thing elſe, could paſs out of the ſame without breaking thereof. Then I approached the *Sealed Glaſs* to the Warmth of the *Fire,* and, as I expected, ſoon found it kindle into a Kind of *Flame,* and to continue ſo to do by emitting *Flames,* and as it were filling up the whole Capacity of the *Glaſs* for ſome ſhort Time; after which it ſeemed to be extinguiſhed, without breaking the Glaſs, or ſo much as cracking it.

2. That I might be the better ſatisfied what this Matter ſo *flaming* did reſolve into, I made this following Experiment: I made another ſmall *Bubble* with a pretty large Tube for the Neck, and left it open at the Top, to be as a Chimney to the *Fire* below it in the *Ball*; then I made the Matter to flame as before, by approaching it to the Heat, and found my Chimney as well as the upper Part of the *Bubble* lined with a yellowiſh *Sulphur,* which, though thus *ſublimed,* was not yet wholly diveſted of its *ſhining* Property; but when a little warmed, the whole *Bubble* would *ſhine.*

3. To try at what rate it would *burn* in the open Air, I made a Piece of it *flame* merely by approaching it to the Warmth of the Fire, and found it to *burn* like a Piece of *Nitre,* but without any *Exploſion,* for it only *flamed* away pretty nimbly.

4. I have further obſerved that it leaves a red tenacious Matter upon its going out, that looks not unlike to red Wax, and is ſo *ſoure*, that it ſets the Teeth on Edge, and diſſolves Iron.

5. Expoſing a large Piece of it, that was carefully weighed, it continued a great while *ſhining* before the *Light* was quite extinct; and examining the Quantity of the Liquor that it reſolved into, I was not a little ſurprized when I found it *thrice* its firſt *Weight* at leaſt. Some that taſted of it, called it *Spirit* of *Sulphur*, others *Spirit* of *Salt*.

6. I attempted to make Mr. *Preſident*'s Experiment, by the Application of ſome *Wick*, to ſee if its *Light* and *Flame* could be more concentrated and directed into one Body by ſome ſuch Application, either to the *ſolid* or *fluid* Matter; but I cannot as yet find any Expedient of doing it: For ſo ſoon as the *ſolid* Matter kindles into an actual *Fire*, it preſently conſumes itſelf and the *Wick*; and the *Fluid* will not take *Fire* at all, though actually heated, and ſo I could not drive it up the *Wick*; nor is the *Light* vivid enough to do any great ſervice. However, I conceive the *liquid* Form may be much more uſeful than the *ſolid* for giving *Light*; becauſe, filling Part of a large ſpherical Glaſs, of about 5 or 6 Inches Diameter, with the *Fluid*, I found the whole Cavity of the Glaſs above the Liquor ſo filled with *ſhining* Steams, that I was able pretty well to read a large Character thereby.

7. It being generally now agreed, that the *Fire* and *Flame* have their *Pabulum* out of the *Air*, I was willing to try this Matter *in Vacuo*.

To effect this, I placed a conſiderable Lump of this Matter under a Glaſs, which I fixed to an *Engine* for *exhauſting* the *Air*; then removing the *Candles* for ſome Time, I carefully obſerved at what rate it *ſhined*: When I was well ſatisfied what Degree of *Light* there was, I preſently drew the Sucker of the *Engine* (it was one of Dr. *Papin*'s make) and found it grow *lighter*, though a Charcoal that was well kindled would be quite extinguiſhed at the firſt Draught; and upon the 3d and 4th Draught, which very well *exhauſted* the Glaſs, it much increaſed its *Light*, and continued ſo to *ſhine* with its increaſed Light, till I was weary with obſerving it, when I re-admitted the *Air*, and ſaw it again return to its former Dullneſs.

8. Endeavouring to blow it up to a *Flame* with a Pair of Bellows, I thought I had quite blown it out, for it lay a good while dead before any *Light* appeared.

9. All Liquors are apt to extinguſh this *Light* when the Matter is plunged into them; nor will it *ſhine* or *burn* though you boil it in the moſt *inflammable* Liquors, though it be *Oil* of *Olives*, *Spirit* of *Turpentine*, or even *Spirit* of *Wine*.

A Parallel betwixt Lightning *and a* Phoſphorus; *by Dr.* Fred. Slare. *n.* 150. *p.* 289.

3. 1. In order to the keeping my *ſolid Phoſphorus* from conſuming, I uſually placed it at the Bottom of a Glaſs of *Water*: Having ſeveral of theſe Glaſſes diſpoſed upon a Table in View, whilſt I lay upon my Bed, I could obſerve ſeveral *Flaſhes* of *Light* that ſucceſſively paſs'd through the *Water*, and made ſuch bright and vigorous *Corruſcations* in the *Air*, as would ſurprize and affrighten one not uſed to the *Phænomenon*. This *fiery Meteor*

paſſes ſomething contracted through the incumbent Water, but expands itſelf much as ſoon as it gets above it. If you would make theſe Experiments to Advantage, the Glaſs ought to be deep and cylindrical, and not above 3 *quarters* filled with Water.

If we compare theſe Appearances with *Lightning*, we may obſerve that *Lightning*, which comes at Intervals, paſſes uninterrupted thro' the moſt condenſed Clouds, and is not extinguiſhed or obſtructed by the greateſt *Storms* or *Cataracts* of Water, but, like the *Beams* of the *Sun*, or any other *Fire*, freely paſſes through Glaſs and Water.

2. This *Phoſphorus* in the mentioned State only emits theſe *Flaſhes* of *Light* in *warm* Weather, a certain Temper of the *Air* being neceſſary to produce the Effect; for in the *Winter*, or *cold* Weather, I never obſerved it.

The *warm* Seaſon of the *Summer* is moſt productive of *Lightning*.

3. The mentioned *Flaſh* of *Light* is not apt to kindle or *burn* any combuſtible Matter, as I found by holding my Finger in it unmoleſted; but not truſting to that, I held in the *Flame*, *Paper*, *Flax*, and ſuch materials as are apt to take *Fire*, which it did no more than when we projected the *Light* of the *Moon* by a *Concave* Glaſs upon the like Bodies.

Such an inoffenſive *Flame* that of *Lightning* is generally obſerved to be. But,

4. The matter of the *Phoſphorus*, whilſt in a more *condenſed* Body, will eaſily be *accended* by the *Warmth* of the Air, or by the immediate Beams of the *Sun*, and then will *burn* very furiouſly, with ſuch a penetrating *Fire* as will not eaſily be extinguiſhed.

Thus *Lightning*, when *condenſed* or contracted, and wrapt up in a Vehicle of *Air*, ſo that it does not ſo eaſily diffuſe itſelf through the yielding *Æther*, will then ſet *Fire* to *Houſes*, *Trees*, &c. and do great Miſchief.

5. Our Matter, whilſt *burning*, acts the Part of a *Corroſive*; and when it goes out, it reſolves into a *Menſtruum*, that diſſolves *Gold*, *Iron* and other *Metals*.

Thus *Lightning* melts down *Gold*, *Iron*, *Lead* and other *Metals*.

Theſe Experiments were concluded moſt naturally to illuſtrate and reſemble the *Phænomena* of *Lightning*, far exceeding either thoſe made with *Nitre*, *Gun-powder*, or *Aurum Fulminans*.

Some Chymical *and* Medical Obſervations; *by the* Heer Mich. Behm. *n.* 34. *p.* 650.

XVI. I wiſh the celebrated Mr. *Boyle* had favoured us with publiſhing a greater Number of Experiments upon the Nature of *Salts*, how the *Alkaline* or *Lixivious* ones, as being *Fixed*, differ from the *Acid* and *Auſtere*, which are hardly leſs *fixed*, and both of them from the *Volatile*, and other Kinds of *Salt* which are hitherto not ſufficiently explained, and different both in their Texture and Name. For amongſt the *Volatiles*, you ſee the *Urinous Salt* differ from that which is in *Spirit* of *Wine* and other inflammable Spirits; becauſe when they are mixed together they coagulate, and acquire a new Quality or Diſpoſition.

I am in great Hopes of being able to find out a Liquor, which being injected into the *Bladder*, will gently diſſolve the *Stone*.

I lately examined the *Serum* of the *Blood* of Brutes, and obſerved it *coagulate* like the *White of an Egg*, with a very gentle Heat; by adding an *Acid* to it, it hardned moſt of all; but by mixing *Spirit* of *Wine* with it, it remained long *fluid*, and ſtill, more by *Alkalies*.

I have obſerved the *Gout* to appear when the *urinous Acrimony* is not ſeparated by the *Kidnies* from the Maſs of *Blood*, or does not paſs off by the Skin in Form of *Sweat*, but is diſtributed with the *Blood*, and ſticks about the Joints in the colder Ligaments, where, upon Account of the Acrimony of the *Salt*, it produces *ſharp Pains*, (but ſuch as can be got the better of) or by its Glutinous Quality produces *Tophi*, or *Stiffneſs* of the *Joints*. I wiſh ſome of the penetrating Genius's amongſt the *Engliſh* would ſearch farther into this, and communicate their Obſervations to the World, that this Diſeaſe might be no longer thought incurable amongſt Phyſicians. The Thoughts of its being ſo obſtinate made me extremely anxious, eſpecially after I had carefully obſerved that neither *Purging*, nor *Bleeding* was of any Service, *Sweating* and *Cauteries* of very little Uſe, and that *oily Plaiſters* and all *Aſtringents* were hurtful, and beſides, that the *Spirit* of *Wine* and of *Sal Armoniack* did not ſufficiently evacuate or diſcuſs the whole morbifick Matter. Every Body knows that the *Hot Baths* are very good in this Caſe, and I have experienced the Truth of this, eſpecially in the Diuretick Kind. But as the *Hot Baths* are not every where to be met with, I have found out a Liquor, which in Smell, Taſte, and Virtues exactly reſembles them; and by bathing the gouty Limbs with this, and the reſt of the Body with ſimple warm Water, I find great Relief. Beſides, I have found great Service from ſome Pills which I took by my own Preſcription, which promote *Urine*, depurate the Blood, and render it more fluid, reſolve the Matter of the *Stone*, and *Scorbutick Viſcidities* of the *Meſentery*, without any *Purging*. But (though Phyſicians diſſwade People from them) I have found for ſome Years by paſt, the Application of Bliſters to the Part affected to be the beſt and readieſt Remedy both to myſelf and Friends; though to ſuch as are ſubject to *fiſtulous Ulcers*, I would not adviſe them.

Concerning thoſe Diſeaſes which the Noble *Sylvius* derives from the *Efferveſcence* of the *acid Juice* of the *Pancreas* with the *Bile* in the *Duodenum*, I am ſtill much in Doubt. For I never felt that Juice to be *Acid*; nor have I ever ſeen the *Bile efferveſce* with *Acids*, whether they were ſtrong or not, but rather coagulate in the Bottom, in the ſame manner as the *Lac Sulphuris* and other *oily Bodies* are precipitated by *Acids*. I therefore believe with *Helmont*, that by the Mixture of the *Bile* with the *acid Ferment* of the Aliment (which appears plainer than that *Juice*) the *Chyle* is properly tempered. But that ſo many Diſeaſes ſhould ariſe from ſuch a Mixture, although it did raiſe an *Efferveſcence*, Experience contradicts.

Chymical *Experiments*, *by Dr.* Fred. Slare. *n.* 159. *p.* 291.

XVII. 1. We took betwixt 10 and 20 *Gr.* of the *ſolid Phoſphorus*, and cauſed it to melt in as much Water as would juſt cover it, which was about a *Drachm*: After it was actually cold, we poured it into two *Ounces* of *Oil* of *Vitriol*, which being well ſhaken together, did firſt heat, and then throw up ſuch *fiery Balls*, which, like ſo many Stars, will adhere to the Sides of the Glaſs, and continue to *burn* for ſome Time, and *ſhine* not only in the Dark, but at Noon-Day in the enlightened Air.

2. If you pour a ſmall Quantity of *Oil* of *Turpentine* upon the foregoing Mixture, it will take *Fire*, and burn very furiouſly. This Experiment ought to be made in an open Veſſel, where the Air has a free Acceſs. This ſucceeded with *Oil* of *Petroleum* and *de Lateribus*; but *Sallet-Oil* and *Spirit* of *Wine* could not be made to *flame*.

The Ingredients that compoſe this *burning Mixture* are apart cold to the Touch, and ſome of them in the Operations: Thus *Water* and *Oil* of *Vitriol* are cooling in their Nature, but theſe in Conjunction cauſe a great *Heat*, which ſoon excites the Particles of our *Phoſphorus* to an actual *Fire*, and this meeting with an *inflammable* Ingredient, ſuch as *Oil* of *Turpentine* or the like, does produce as conſiderable a *Flame* as boiling Oils are wont to do.

Act. Haſn. 3. According to the Directions of *Borrichius*, to make two Liquors *kindle* one another, though apart they are actually cold, we took 4 *Ounces* of freſh drawn *Spirit* of *Venice Turpentine* to 6 *Ounces* of *Aquafortis* newly drawn and very ſtrong. We mixed them together in a *Glaſs-body*, and accordingly placed the Veſſel in the Sun-beams (which I foretold ſome of the By-ſtanders would deceive us) after half an Hour's Patience the Liquors began to *ferment* very furiouſly, inſomuch that a very great *Smoak* was raiſed by this Means, which was ordered to be kept down by a Cork that ſtopped the Veſſel. This condenſed *red Fume* repreſented *Flame* by reaſon of the Beams of the Sun that were permitted to *ſhine* upon it: But I was aſſured that this was a great Fallacy, and that the Experiment contradicted the Proverb, *There is no* Smoak *without ſome* Fire. I was willing to give the Experiment any Advantage, which made me comply with that Circumſtance of doing it where the Beams of the Sun were admitted: But this very Circumſtance giving ground to the Miſtake, I deſired Leave to make the Experiment in a dark Room, where we ſhould better diſcern any real Productions of *Light*; being aſſured that the *Action* of the *Liquors* would as certainly ſucceed in the darkened Room as in a light one. The Experiment was repeated, and the *Action* of the *Liquors* was no leſs vigorous than in the former Experiment. Moreover, *Flax* being looked upon as a very combuſtible Matter, was ſuſpended in the *Fume*. But in ſhort, the Obſervers of this Experiment, which were many, and very inquiſitive, could not diſcover the leaſt Spark of *Fire* or Glimpſe of *Light*; ſo that the *Flax* remained untouched, and the *fermenting Liquors* gave no *Light*, *Fire*, or *Flame*; only take this Caution, keep your Candles at a Diſtance, or the *Fume* will ſoon take *fire* at any *actual Flame*, and ſet the Liquors a *burning*, and ſo it may impoſe upon the Careleſs.

4. Amongſt thoſe various Mixtures, wherein great *Heats* and *Efferveſcencies* with much *Ebullition* were produced, none were ſo conſiderable as this: Upon an *Ounce* of *Spirit* of *Nitre*, if you pour 2 or 3 *Drachms* gradually of the *higheſt rectified Spirit* of *Wine*, the *Heat* and *Ebullition* will be incredibly great. And whereas, in the former Experiment, you muſt wait a good Time

for your *Efferveſcence*, here it is performed in an Inſtant; ſo that I had more Reaſon to expect, from the mighty *Action* of theſe *Liquors* upon each other, a Production of *actual Fire* or *Flame*, than from *Borrichius*'s Experiment.

Poſſibly ſome may be ready to imitate this Experiment, which may fail them, unleſs they obſerve ſome little Directions. Errors of this Kind have made ſome People believe they are impoſed upon, when there is no ſuch thing. *Common Spirit* of *Nitre*, ſuch as was firſt diſtilled into Water, and afterwards *dephlegmed* (or diſtilled ſo as to have all the Water ſeparated) this will fail your Expectations; it muſt be the *red Spirit* of *Nitre*, and a very *high rectified Spirit* of *Wine*. In the next place, you muſt firſt pour into your Glaſs the *Spirit* of *Nitre*, which is the heavier Liquor, and then the *Spirit* of *Wine* after; for if you invert the Order, you will have no *Ebullition*, which will not a little puzzle the Reaſon of Philoſophers.

In this Experiment (eſpecially if the Ingredients are made very *high*) the *Spirit* of *Nitre* does as it were act the Part of a *Coal* of *Fire*; as *Fire* exhales and drives up Water that is thrown upon it, ſo does this *Spirit* of *Nitre* very furiouſly throw up a great Quantity of the *vinous Spirit*, inſomuch that it preſently perfumes a Room with the Smell. But to be more exact in this Obſervation, we mixed equal Parts together in a *Retort*, and then cemented a *Receiver* of good Dimenſions, and ſo we condenſed that Vapour which riſes from this Mixture, and obtained much of our *Spirit* of *Wine* again.

Both theſe Experiments may ſerve as Arguments againſt the Notion of *Acidum* and *Alkali*, ſince mighty Conflicts may be excited by Bodies of differing Textures, where theſe two Principles are not conſpicuous. We have here indeed very ſtrong *Acids*, but in the other never were any *Alkali's* ſuſpected whether *volatile* or *fixed:* Nor can I think that the latent *Alkali*, imagined to be in the *Spirit* of *Nitre*, does produce this great Conflict; for I queſtion whether there be any ſuch Thing: If it be an *Alkali*, it has quite loſt its Property, that it is not wrought upon by ſo ſtrong an *Acid* in whoſe Boſom it lies. Wood may as well remain incombuſtible in a great Fire, as ſuch an *Alkali* under the Power of ſo great an *Acid*. But this is only a Hint.

5. There are various *Liquors* whoſe Mixtures are apt to produce greater or leſſer *Efferveſcencies*, *Heats* and *Inflammations*; ſo that particularly the great *Incaleſcence* and *Burnings* in *Fevers* are eaſily accounted for, and made obvious by occurring Experiments. There ſeems more Difficulty to account for ſome *cold* Diſaffections of the *Blood* and other Juices of the Body. For *hyſterical* Perſons will complain of a great *Chilneſs* or *Froſt* in the *Blood*, during that *Paroxyſm*, ſuch as a good Fire and warm Cordials will not eaſily conquer. In theſe Perſons the *Pulſe* is always very tardy (differing from what I have obſerved in *Agues*, where in the *cold Fit* it has been very quick.) This may be better explicated by a Solution of *Sal Armoniac* than of *Nitre* in *Water*.

In about a *Pint* of *Water* we diſſolved about a *Quarter* of a *Pound* of *Sal Armoniac*, which was found to be ſo very *cold* to the Touch, that we needed no *Weather-Glaſs* to convince us of the Effect.

In this Experiment we have no *Ebullition* or *Swelling* of the *Liquors*, but rather a *Condenſation*, which may alſo happen in the *hyſterical frigid Paroxyſm*; for in caſe the Humours ſwelled, they would require more Space, which perhaps is not to be allowed, but muſt then be compenſated by the *Acceleration* of the *Pulſe*, which would then be obliged to tranſmit the extended Humours in a ſhorter Time; but this is not our Caſe here, but refers to the next. I here choſe to explain the *Affections* of the *Blood* by the Solution of *Sal Armoniac*, that (as we ſaid in our Experiment) affected the *Blood* of thoſe Perſons that long touched it, with a ſenſible and troubleſome Degree of *Cold*. For the Maſs of *Blood* may be very apt to degenerate into ſuch *Concretions* as do much reſemble *Sal Armoniac*; and this will ſeem more probable, if we conſider that *human* and other *Blood* naturally abounds with *urinous Salts*, and do preternaturally degenerate into *acrimonious* and *pungent* Juices, which may be much promoted by a too liberal Uſe of high-ſeaſoned or ſalted Meat, and ſour Liquors. For this we find by Experience, that ſuch an *Acid* as *Spirit* of *Salt* mixing with an *Urinous*, will be converted into *Sal Armoniac* (which has now loſt much of its *volatile* Nature.) This we may plainly diſcern by its ſhooting into a Figure that reſembles Feathers, which is proper to *Sal Armoniac*. That the *Blood* does abound with various Sorts of *Salts* is not to be doubted; and that it has ſuch a *Salt* as ſome call *Salſum*, which is *Sea-ſalt*, I lately exhibited at the *Royal Society*: And laſtly, that *Sal Armoniac* has its principal Dependance on great Quantities of *volatile Salt* (ſuch as the *Blood* is ſtored with) and on this mentioned *Salt*, is very well known. So that having preſuppoſed ſuch Concretions as theſe to have their Exiſtence in the *Blood*, we muſt conſider how they come to act. That there may be ſome antecedent and other concomitant Cauſes of *hyſterical Paſſions*, I do not deny; I only, or principally conſider the Cauſe of the *cold* Affections.

It is very probable that the *Glands* do ſuffer great Obſtructions, which are antecedent to this *Paroxyſm*: I am the rather inclined to this Opinion, by reaſon of ſo great a *Thirſt* as our Patients are apt to complain of before, and in the Fit; by which Obſtructions the uſual Secretions of the *Lympha* are hindred as well from watering the Mouth as the *Oeſophagus* and *Stomach*, which cauſes *Thirſt*. Moreover, the leſs Quantity of *Lympha* is evacuated the uſual Way, the more is abſorbed by the *Veins*, which does ſo dilute thoſe *Salts* in the Maſs of *Blood* as brings them to a *Fluor*, or ſuch Solution as is neceſſary to give the *cold* Effect. Thus *Sal Armoniac* will mix with ſome Liquors and not with others; ſcarce at all with *Spirit* of *Wine*, and not ſo well with *Wine* as *Water*; and the more limpid the Water is, the better and ſooner it diſſolves, and to this Menſtruum does eſpecially impart this *cold* Operation. Which not unreaſonable Conjecture of an extraordinary Effuſion of *Lympha* into the Maſs of *Blood* at ſuch a Time, is further confirmed by that great Quantity of *Urine* thoſe Perſons are apt to make; which has made ſome fear a *Diabetes* that have not been well verſed in ſuch Caſes: For the *Urine* here will look very pale and limpid. And this may be further proved, that when the *cuticular Glands* are hindered from doing their *tranſpiring* Office, particularly by any cold ambient Fluid which happens to them that go into Water, that then they are obliged to throw off greater Quantities of *Urine*, which has been obſerved by me to be very pale and inſipid after a 2d or 3d Evacuation.

6. If we take any *Acid*, whether of *Vinegar*, *Verjuice*, *Wood-Sorrel*, *Oranges*, *Lemons*, or perhaps yet milder ones, by caſting into theſe Juices a *volatile Salt* of *human Blood*, I always obſerved a notable *Ebullition* would enſue, which I never could find would *heat*, as ſuch boiling Liquors are apt to do (and one would expect they ſhould) But on the contrary, affected a good *Weather-Glaſs* ſo as to make the Liquor deſcend, which was a manifeſt Token of *Cold*. There I found that the higher the *Acid* was, the greater the *Ebullition* and the *Cold* would be; which is very remarkable. For this Reaſon I made uſe of very ſtrong *Vinegar*, dephlegmed by *freezing* (which Way is taught by the honourable Mr. *Boyle*, to whoſe great Favour and Manuduction I muſt aſcribe whatever Service I ſhall be able to do *Experimental Philoſophy*) and by this Mixture we came much nearer the *freezing Point*. But ſince it proves troubleſome to prepare this *Vinegar*, and becauſe it can be done only at certain Times, I have moſt commonly made the Experiment with *Spirit* of *Venus* or *Verdigreaſe*, which is the higheſt *Vinegar* in the World: With this the *Cold* will be moſt ſenſible to the Touch, and moſt conſpicuous on the *Weather-Glaſs*. For by this Mixture I have in the *Summer* made a *Weather-Glaſs* to deſcend below the Temperament of cold Fountain-water, 6 *Inches* at leaſt, which brought it ſo near the *freezing* Mark, that it ſcarce wanted *half* an *Inch*. But at the ſame Time the Liquor *ſwells* and takes up more Room than before, and will not be contained in ſhallow Veſſels. In this Experiment we have ſome Things very rare, that a great and violent Motion of two diſſenting Liquors, ſhould be ſo far from producing *Heat*, as to produce a notable Degree of *Cold*, and that too with a conſiderable *Expanſion* of their Parts. Here we might inſtance in an appoſite and as unexpected an Experiment, where an Effect contrary to our common Obſervation happens, and that is thus: If you mix with *Oil* of *Vitriol* a Quantity of *Water*, a great *Heat* will follow without an *Expanſion* of theſe Liquors; whereas *Heat* does conſtantly produce it in *Wine*, *Water*, and moſt *fluid* and *ſolid* Bodies: For here it rather *ſhrinks* and *condenſes*, as you may ſee by making the Experiment in a Glaſs with a long Neck, and ſetting your Mark as ſoon as you make your Mixture. Both theſe Inſtances may a little puzzle the *Carteſian Hypotheſis* to account for, though I am far from thinking they are able to deſtroy it. But to proceed with our Experiments: After I had ſufficiently ſatisfied the worthy Spectators, that the produced Degree of *Cold* was very conſiderable, I then poured in ſome few Drops of another Liquor, that ſoon altered the Temper of our *cold* Mixture, and in two or three Minutes brought it to a Warmth beyond that of the ambient Air, though it was a very warm Sun-ſhining Day, in *July*.

To apply the Experiment. In the *cold Fit* of an *Ague* we have often a ſtrong and quick *Pulſe*, which argues an *Ebullition* (though I dare not call it an *Efferveſcence)* and quick Motion of the *Blood*, and the *Pains* of the *Head* and other Parts may be due to too great Diſtreſs or Extenſion of the Veſſels, which depends on the *Expanſion* of the boiling Humours. In this artificial, though *cold* Mixture, we obſerve a mighty *Commotion* and high *Ebullition* and *Expanſion* of the *Liquor*. In the *Blood* and other Juices of the Body we conſtantly diſcover great Quantities of *volatile Salts*, and ſometimes either from an infected Air, or bad Diet, and from ſeveral other Cauſes, *ſour* Juices may be derived to the *Blood*, which may ſo act upon thoſe *volatile Salts*, the *Blood* ſo much abounds with, as to give a notable Senſe of *Cold*. It is no new thing for us to meet with Patients, that have thrown upon their *Stomach* and *Bowels* (which are the great *Emunctories* of the *Blood*) very ſour Liquors, ſuch as when they happen to fall upon the *Teeth*, will corrode thoſe hard Parts. Thus in our *Experiment* it is plain, that a foreign *Acid* meeting with a *volatile Salt* drawn from the *Blood*, does produce a *cold Effect:* And ſince we know no Liquors but a Mixture of this Kind, that gives ſuch a *cold Phænomenon*, it ſeems not unreaſonable to believe that the *cold Fit* of an *Ague* may be due to ſuch a Mixture.

As to the *Incaleſcence* made in our Mixture, I ſhould have told you, that it was done by the bare Addition of ſome Drops of *Oil* of *Sulphur per Campanam*, being a Liquor that owes its Origine to the *Fire*, I ſuppoſe it to have borrowed that *calorifick* Quality thence, which made it repreſent the *hot Fit:* For this I obſerved, that notwithſtanding the Action of the *cold* Mixture, it grew more thick and ſlimy than it was at firſt, and that the Addition of the mentioned *Oil*, or *Spirit* of *Brimſtone*, made it more clear and fluid. Thus the agile Spirits of the human Body, which though they cannot be thought to be actual Fire, yet are ſuppoſed to be ſomewhat analogous to it, being in more abundance poured into the turbid Maſs of *Blood*, do by their Warmth and Action firſt attenuate thoſe groſs *Coagulums*, and then manifeſtly ſubdue and reduce many of thoſe indiſpoſed Particles to a good Texture, and expel thoſe that are diſagreeable by *Sweat* and *Urine*, or both ways; which is a good *Prognoſtick* of a Cure of that *Paroxyſm*.

I ſhall only add this Objection made, *viz.* That there are no ſuch *Acids* of ſo high a Degree of *Acidity* found in the human Body as we make our Experiments with. To which I may Anſwer, that there is no need alſo of ſo great a Degree of *Cold* to put our *Blood* into an *Ague*, a ſmall Declination from its uſual Temperature, being ſufficient to make us very ſenſible.

7. A *Member* of the *R. Society* having propoſed to try if the *Cortex Peruvianus* would not prevent this *artificial Ague*, we made a ſtrong *Infuſion* of our *Bark* in common *Vinegar*, and then injected a Quantity of the mentioned *volatile Salt*, a conſiderable *Commotion* of the Liquor enſued with a Degree of *cold*, but was not altogether ſo fierce as formerly; moreover, it abated much of riſing to the Height of the former Experiment, when *Opium* was mixed with the mentioned *Cortex*; though in this Caſe the *Acidity* was

far from being quite mortified. As to the *Cortex*, I do not intend in this Experiment, to explain its Nature, which was only made to ſatisfy that ſagacious Gentleman's Curioſity: For I never thought that *Febrifuge* did act the Part of an *Alkali* in performing the Cure. But if I can make it appear that there are other Medicines that do pertain or belong to the Family of *Alkalies*, which are effectual in the Cure of *Agues*, this may ſerve to prove, that they do it by deſtroying ſome morbid *Acidities* in the *Humours* or *Viſcera*, and ſo prevent the uſual *Commotions* ſuch diſagreeable Liquids are apt to make upon their Conventions. This is manifeſt, that *Coral* and *Crabs Eyes*, and other *teſtaceous* Bodies numbered amongſt the *fixed Alkalies*, and not only theſe but thoſe real *fixed Salts*, as *Sal Abſynthii*, *Cardui Benedicti*, &c. as well as the *volatile Salts* in general, do highly correct and change *acid* Humours where they can meet them, and not only ſo, but do hinder Liquors that are apt to ſour and corrupt from degenerating (thus *Milk*, and *Blood* itſelf, may be preſerved much longer; the firſt from growing *ſour*, the laſt from *fermenting* and *putrifying*, by a Quantity of *volatile Salt* or *Spirit* mixed with them) which is in like manner granted to be true, that many *Agues* have been cured by Medicines of this Nature; *Sal Abſynthii* as well as *volatile Salts* are uſed as the principal Ingredients in common *Febrifuges*. For a farther Proſecution of this Experiment, we diſſolved as much *Chalk* as ſtrong *Vinegar* was able to do, and then having ſtrained it through a Filter, we poured it upon a Quantity of the *highly rectified Spirit* of *Blood*, but found neither *Ebullition*, or any Senſation of *Cold* or *Heat* to follow.

n. 213. p. 200. XVIII. 1. *A Catalogue of thoſe* Oils *that will take* Fire *with a great* Noiſe *and* Exploſion, *when the* Compound Spirit *of* Nitre *is poured upon any of them*; *and of thoſe* Oils *that do only make a great* Noiſe *with* Exploſion, *but will not take* Fire; *and alſo of thoſe that do not make either* Efferveſcence *or* Exploſion. *The* firſt *is marked with two Stars* * *. *The* ſecond *with one* *. *The* laſt *has no Mark at all. By Dr.* Fred. Slare.

- OILS
  - *Vegetable*
    - *Eſſential*
      - Perfect *Stillations* made by the *Analyſis* of the *chymical Fires*, where the *oleaginous* Particles are truly ſeparated from all other,
        - *Light*, or *Æthereal*, *which* are *ſpecifically* lighter *than Water* and *Brandy*, and ſome than *Spirit* of *Wine*, and are uſually drawn from the *Seeds* of *Vegetables*: Such as from
          - *Seeds.*: *Carvi* * *, *Cummin* *, *Fennel* *, *Dill* *
          - *Berries.*: *Juniper* *, *Bay* *
          - *Tops* of *Plants.*: *Thyme* *, *Wormwood* *, *Angelica* *, *Hyſop* *, *Lavender* *, *Roſemary* *, *Penny-royal* *, *Rue* *, *Sage* *, *Savin* *
          - *Fruits.*: *Lemons* *, *Oranges* *, *Nutmegs* *, *Cloves* * *
        - *Ponderous* or heavy, which do commonly ſink in *Water*, being diſtilled from the heavy Parts either of the *Wood* or *Cortex* of *Trees*. Such as from
          - *Wood.*: *Saſſafras* * *, *Guajacum* * *, *Box* * *, *Camphire* * *
          - *Cortex.*: *Jamaica Pepper* * *, *Cinamon* * *
    - *Not Eſſential.*
      - *Imperfect*, made by *Expreſſion*, which are decompounded of ſeveral Parts of the *Plant*; as of
        - *Fruits.*: *Almonds*, *Olives*, *Walnuts*
        - *Seeds.*: *Line*, *Rape*
  - *Animal* of *ſolid* Parts — — — — — — *Hartſhorn* * *, *Man's Skull* * *, *Hoofs* * *
    - *Fluid* — — — — — — — — *Human Blood* * *
  - *Mineral* of — — — — — — — — — — *Amber* or *Succinum.*, *Petroleum.*, *Barbado's Tar*, *Bee's Wax.*

Spirit of *Wine* will give ſome Flaſhes of *Fire*.

Balſam of *Sulphur*, a compound Body made with *Oil* of *Turpentine* and *Brimſtone*, if not too thick, will *flame*.

You have *twelve* Sorts of *Oils* that do make *Ebullition*, *Exploſion*, and *Flame*; 18, *Ebullition* and *Exploſion* without *Flame*; 4, that produce *neither*; by the Mixture of our *Compound Spirit* of *Nitre*.

2. Take

A Mixture of two cold Liquors producing an actual Flame. *Ib.* *p.* 201.

2. Take of any of the *eſſential Oils* ſet down in the Catalogue, one Part; of the *compound Spirit* of *Nitre* two Parts (theſe may be *Drachms* if you pleaſe) and they will, with great Celerity and a great Noiſe, produce a *Flame* which laſts a very little while, but leaves an inſipid *Caput Mortuum*, as light and taſtleſs as a Cobweb.

Note, 1. This Experiment ſhould be made under a Chimney, or any convenient Draught, that ſo the offenſive Steams may evaporate.

2. A Gally-pot ſpacious enough to hold 4 or 5 *Ounces* of Water, may be a convenient Veſſel for this Experiment, if you only uſe the fore-mentioned Proportion; but if you pleaſe to uſe larger Quantities, then you muſt enlarge the Veſſel.

3. You muſt put the *Oil* into the Gally-pot firſt, and then pour the *Spirit* on the *Oil*; becauſe the *Spirit* being heavier, does the better paſs through the *Oil*, and make a more expeditious Mixture. This muſt not be dropped in gradually, but conveyed in all together.

4. Hold not your Head too near the Gally-pot, leſt the ſudden *Exploſion* of the Matter ſhould ſtrike up ſome of it in your Face.

5. The *compound Spirit* will loſe much of its Virtue if kept too long.

The Way of Preparing the compound Spirit *of* Nitre. *Ib.* p. 202.

3. Take of *Salt Peter* and *Oil* of *Vitriol* equal Parts, and *diſtil* theſe out of a *Retort* in a good *Sand Furnace*, ſo that the Sand continue red-hot for ſome Hours; for the *Fire* cannot be too great: The *Fumes* will riſe of a very deep red Colour, and will ſettle in the *Receiver*, in the Form of a Liquor, which muſt be carefully preſerved from the Air; this being the *Spirit* with which all our Experiments were made, which are referred to in the Catalogue.

To make the common *Spirit* of *Nitre*, you need only to mix 5 or 6 Times as much Clay as you take of *Nitre*, and *diſtil* them in a *Retort*, and you may obtain a ſtrong *Spirit* of *Nitre* this Way, eſpecially if you *dephlegm* it, and *rectify* it to the beſt Advantage.

With this we have made an Experiment of *Accenſion*, that ſucceeds ſometimes, but with great Uncertainty; but the firſt, which I call the *compound Spirit* of *Nitre*, is only to be relied on.

This *compound Spirit* ſeems to be the active Principle that ſtirs up the *oily*, or more paſſive Particles to take *Fire*; which will more eaſily be agreed to, if we conſider that our *compound Spirit* of *Nitre* does not only conſiſt of all thoſe *igneous* Particles to be found in *common Spirit* of *Nitre*, but that it has alſo thoſe *igneous* Particles which *Oil* of *Vitriol* contains in it, crouded into our *Spirit* of *Nitre* made this Way

For further Illuſtration, let us conſider, that *Oil* of *Vitriol* is a Creature of the *Fire*; that the *Sulphur*, which is plentiful in *Vitriol*, or in *Copperas*, is *accended*, and afterwards *diſtilled* over in the Form of a Liquor, which is a liquid Sort of *Fire*, as having many Properties of it. If you put it to Water, it will make it *boiling hot*: It *burns* not only Linnen and Woollen, but Wood to a Coal, and ſcarce ſpares any thing.

Nitre, the other Ingredient of our *Spirit*, is very ſuſceptible of *Flame*, which does alſo incorporate many *igneous* and corroſive Particles, after it has ſo many Hours lain ignited in the *Fire*, comes over, by *Diſtillation*, very highly impregnated with the ſame *fiery* Particles; which is obvious to any one that has uſed to make Experiments with it. For *Nitre* itſelf has no diſſolving or heating Quality, but is a great Cooler, and ſcarce can be reckoned amongſt *Acids*; but after it comes out of the *Fire*, in the Form of a *Spirit*, it tears in Pieces almoſt all Metals, and brings them to a ſort of Fuſion, as *actual Fire* does: It diſſolves Animals and Vegetables, and Minerals; and has many Effects of *Fire*. Therefore from an Union of theſe two very *fiery Spirits* reſults a much greater Quantity of *igneous* Matter.

That *Fire* is very apt to incorporate with Fluids, and even ſuch as have had but a ſmall Communication with it, an Experiment, which I formerly exhibited at a *Meeting* of the *R. Society*, makes probable.

We took of *Spirit* of *Wine*, that was highly *rectified*, a Wine Glaſs half full, and placed a tender Weather-Glaſs or *Thermometer* in the Glaſs, and then put a Spoonful of Water to it; this immediately *warmed* the Liquor, and made the *Weather-Glaſs* aſcend two Inches at leaſt: The Liquor in the *Weather-Glaſs* ſubſided as the other Mixture grew *cold*. I made it alſo ſenſible to the Touch, by filling the Palm of the then *Preſident*'s Hand with *Spirit* of *Wine*, and putting a ſmall Quantity of *cold Water* into the ſame Hand, which made it ſenſibly *warm* his Hand, as well as others that made the Trial. But from this *Spirit*, which is too *volatile* to endure much Communication with the *Fire*, you may expect only a mild tepid *Heat*. I am apt to believe, that there is ſcarce any thing which lies long in the *Fire*, but is apt to retain ſome *igneous* Particles; which does appear to be ſo in all *fixed Salts*, in *quick Lime*, and more particularly in *Iron*. If you take a Bar of *Iron*, though of an hundred Years old, and *file* off about a Pound of it, and then you do mix and imbibe theſe *Filings* with a due Proportion of *Water*, enough to make the whole juſt moiſt; the *Fire*, which all this while lay concealed in the *Iron*, being more diſpoſed to enter into the *Fluid*, does, by theſe means, *warm* the whole Maſs. The *Iron* gained this *heating* Quality by *Fuſion* in thoſe fierce *Fires* which firſt ſeparated the *Metal* from the *Ore*: For it is not in the Nature of the *Ore* before *Fuſion* to emit any *Heat*, as I have found by mixing *Water* with it. There are a great many other Inſtances which make it very plain, that *Fire* will add both to the Bulk and Weight of Bodies; but theſe affect ſolid Bodies more manifeſtly. The Effect itſelf produced by our *Fluid*, does neceſſarily prove the inherent *fiery* Particles to have cauſed the *Accenſion*.

And this leads us to conſider the other Part of our Matter, which, in Conjunction with the *compound Spirit*, cauſes this *Accenſion* and *Exploſion*.

But here it will not be amiſs to premiſe a Diſtinction of *Oils* into *Vegetable*, *Animal*, and *Mineral*; having made ſome Experiments with all theſe, but moſt of all with *Vegetable*; for which reaſon we ſubdivide again the *Vegetable* into thoſe made by *Expreſſion*, and thoſe made by *Diſtillation*: And of thoſe made by *Diſtillation* we diſtinguiſh thoſe that are made out of the *Seeds* from thoſe that are made out of the *Trunks*, or *Cortex*, or *Roots*, or any other Part of the *Vegetable*. We further obſerve a Difference betwixt

thoſe

thoſe *Seeds* that have only a fragrant Smell and a pungent Taſte alone; thoſe that have both odorous Emanations and a briſk Taſte together; and thoſe that are inſipid, and have no ſmart Taſte.

In the firſt place we muſt ſet aſide thoſe *Oils* made by *Expreſſion:* For having tried *Oil* of *Linſeeds*, of *Nuts*, of *Olives*, of *Almonds*, &c. we found theſe would not make *Exploſion*, or *Ebullition*, or ſo much as any *Fermentation*, with our *fiery* Meteor. Nor could I, without much ſtirring, bring them to incorporate; and when they did incorporate, the *Heat* was but juſt ſenſible; and the Reaſon may be, becauſe this ſort of *Oil*, though it muſt be allowed to be a true *Pabulum Flammæ*, for it may be made to *flame* all away; yet it is not a true *Oil*, although it muſt be allowed to have one Property of *Oil*, that it mixes not with Water; yet it doth not ſtand the Teſt of the *Fire*; for if you *diſtil* it, you may part from it *Water* and *Earth*, and *Soot*, and a true *eſſential Oil*, which afterward will bear repeated *Diſtillations* without any further *Diſſolution*.

Having ſet by theſe *vegetable*, but not *eſſential Oils*, we will briefly examine the *mineral Oils*, of which there are ſome, as *Oil* of *Vitriol*, *Oil* of *Sulphur per Campanam*, that have not any Property of *Oils*, but are rather *Acids* and corroding *Menſtruums*. There are others which have the true Property of *eſſential Oils*, as *Oleum Petrolei*, and *Barbados Tar* highly rectified, which do not produce any remarkable *Heat*, much leſs make an *Ebullition* or *Exploſion:* Nor does that active *Oil* of *Amber* do any thing more.

The *ſtillatitious Oil* of *Bees-wax* had much the ſame Effect, when it was incorporated with our *compound fiery Spirit:* And this inclines me to believe that the *Wax* itſelf may be a Compound more belonging to a *mineral* than *vegetable* Nature.

And now we will examine thoſe *eſſential Oils*, which do produce great *Ebullition*, *Exploſion*, and *Flame*, with the *compound Spirit*. Of theſe we have two Sorts, *Vegetable* and *Animal*.

The true *vegetable eſſential Oils* do all of them make violent *Ebullition* and *Exploſion*, and ſeveral do actually take *Fire*, and *flame*, as the Catalogue of Experiments does ſpecify.

If it be inquired into, what Share the *Oil* has in producing this Fire, whether only it be a *Pabulum*, or Fuel, for the *Spirit* to actuate, and ſo be merely paſſive? Or whether it contributes any Particles that do help to excite this *Flame?*

In order to reſolving this Doubt, we conſider, that theſe *eſſential Oils* are produced from *Seeds* that have very active or warm Parts or Spirits, ſuch as will eaſily ferment and heat, and having a warming Influence upon our Tongues, and do give Heat to the Stomach and Blood of Animals. That the *Seed* is the Syſtem or Concentration of the whole *Plant*, and has *Spirit* or *Ferment* enough lodged in it to aſſimilate all that inſipid watry Element (which contributes Matter to its *Growth*) into its own Nature: From hence the great Quantities of *eſſential Oils* are produced. 'Tis true, out of the *Trunks*, and *Roots*, and other Parts of *Trees*, we have *eſſential Oils* extracted, but with a vaſt Diſparity, there being only a very ſmall Quantity (in Proportion to what is in the *Seeds*) floating up and down the other Parts of the *Vegetable*.

But I am not only to take notice of the potential Warmth of the *Vegetable*, there being, in my Opinion, another Ingredient fit to be obſerved, which our *eſſential Oils* may be proved to contain, and that is a *volatile Salt*, which gives much of that Pungency to the Taſte. If we conſider the conſtituent Parts of theſe active *Vegetables*, they much abound with *Salts*, which by a moderate Fire are made *volatile*, and by a violent Fire are *fixed*. This ſeems to me more than probable by what I have found in a Quantity of *Oil* of *Cinnamon*, having had it in my own keeping for 20 Years; for about 10 or 12 Years it continued the ſame, but within theſe 6 latter Years it has annually let fall ſome *Salt*, inſomuch that it is now one half of it turned to *Salt*, and this without Addition, or any Art uſed to reduce it to this Form.

There is alſo ſeparated in *Diſtillation* of great Quantities of *Vegetables*, as of *Thyme*, *Origany*, *Penny-royal*, *&c.* a *volatile Salt* of a peculiar Nature (which our excellent Chymiſt, Mr. *Molt*, firſt ſhewed me, and keeps Quantities of it by him): This is very clear, or cryſtalline; in its *ſpecifick Gravity* a ſmall Matter heavier than Water; and ſeems to be *Salt* and *Oil* coagulated into a Body: It will not diſſolve in Water, but eaſily evaporates when heated. I now conſider theſe *Salts* as *Alkalies*, which all true *volatile Salts* are: They do preſently *ferment* and make great Colliſion with *Acids*, and therefore I am much inclined to make this Inference, that our *Oil* is not a bare *Pabulum Ignis*, or an unactive Principle, but does, upon a double Account, as well upon the Score of the incaleſcent *Oil* as of the inherent *Salt*, conſpire with the *compound Spirit* to make this great *Heat*, *Exploſion*, and *Accenſion*.

In the *Catalogue* of Experiments, we may further obſerve, that of the light *eſſential Oils* drawn from *Seeds* of *Vegetables*, all of them do make a great *Ebullition* with an *Exploſion*, but that few of them do actually take *Fire*; and that all of thoſe that are drawn from *Trunks*, or other Parts of our *Vegetables*, do certainly take *Fire*, and *flame*. Wherefore having obſerved, that thoſe that do not take *Fire*, or *flame*, did yet make as great an *Exploſion* and *Ebullition*, and probably as great an *Heat* as thoſe that did, I was apt to impute it to the Lightneſs and too great Subtility and Volatility of thoſe *eſſential Oils*, whoſe very active Particles did too ſoon exhale or fly away. And this Conjecture is ſomething juſtified by the Addition of a more ramous Body (which was *Balſam* of *Sulphur* made with *Oil* of *Turpentine*) to our moſt *volatile* or *ſubtile Oils*, which then produced a *Flame*, whoſe Particles being more craſs or ramous, will detain the more *volatile Oil* from too quick an *Exploſion*, and give more Time to the *fiery Spirit* to penetrate, and mix itſelf with thoſe combuſtible Materials. And this may be one Reaſon why the *ponderous Oils* diſtilled from the Roots or ligneous Parts of a *Plant* do all take *Fire*; namely, becauſe the Parts of this Sort of *Oil*, lying cloſer together, do not ſo ſoon diſſipate after the *Spirit* is caſt upon it. And then as to the *ſpecifick Gravity*, the Difference is alſo very conſiderable, which any one may find by this familiar Way: If you fill a Glaſs with one *Ounce* of the *eſſential Oil* of the *Seeds*, you will require Nine *Drachms* of the *ponderous Oil* of the *Vegetable* to fill up the ſame Space.

This is alſo very obvious to any Spectator, that moſt of theſe *Oils*, thus diſtilled, are more *ponderous* than common Water, by their ſinking to the Bottom; whereas all our *eſſential Oils*, drawn from the *ſeedy* Parts, do ſwim on Water, and ſome are lighter than the beſt *rectified Spirit* of *Wine*, but moſt are lighter than *Brandy*, which has made our Chymiſts call them *æthereal Oils*.

In the *Catalogue* of Experiments, you may find which are the *ponderous Oils* that do conſtantly take *Fire*. Moreover, the *ponderous Oils* have yet one Advantage above the *lighter volatile Oils*, they having been expoſed to a longer and ſtronger Degree of *Fire* than the others, and ſo do incorporate more *igneous* Particles with themſelves, which, being put in Motion, may contribute ſomething to cauſe this *Accenſion*.

The *Oils* diſtilled from *Animal* Bodies do all of them take *Fire* and *Flame*, but with this Difference, they do not make ſo great an *Exploſion* as the *Vegetable* do, but do more certainly take *Fire*, and will continue their *Flame* longer, but not ſo fierce as the other. If we rightly examine the Conſtitution or Texture of this *Oil*, we have ſeveral Properties adapted to the Production of this Effect. You have a much greater Degree of *Fire* required in the *Diſtillation* of this *Oil* than is neceſſary for that of the *Vegetable*. You have alſo a great Quantity of *volatile Salts* (which are true *Alkalies*) that do paſs over with your *Oil*: And you have a *ponderous Oil*, that ſinks in Water; which being conſidered, and weighed together, do make it equitable to expect a more conſtant *Accenſion* from the *animal Oils* than from any other.

Oleum Succini is juſtly put in the *Catalogue* of *Minerals*, and is produced by a ſtrong Degree of *Fire* (as is above-mentioned), yet does it not make any *Motion*, and ſcarce any *Incaleſcence* with this *Oil*, notwithſtanding its abounding with *volatile Salts*: The Reaſon is, becauſe theſe *Salts* are not properly *volatile*, as *Alkalies* are, but do belong to the Family of *Acids*, and ſo can make no *Ferment* with this *compound Spirit*, which is itſelf highly *Acid*.

Having now made it plain and eaſy for any one to make two Liquors, actually cold, without any adventitious *Heat* or *Fire*, boil up to *Flame*, it will ſeem ſtrange that, after ſo many Experiments made in the World, by all Sorts of *Chymiſts*, and with all manner of fermenting and *fiery* Ingredients, none ſhould have diſcovered a certain Way of producing this great and deſirable Effect. For though I will not queſtion the Veracity of the great *Borrichius*, who declares to the World, that he made his *Oil* of *Turpentine* and *Spirit* of *Nitre* to take *Fire* and *flame*; yet, for my Part, after ſo many unſucceſsful Experiments made with the greateſt Accuracy I could, I muſt ſtill own my Incapacity to perform it: But if you add ſome Drops

Vid. Sup. Sect. XVII.

of *Balſam* of *Sulphur* to that *Oil* of *Turpentine*, the Effect will then very certainly ſucceed, and your Mixture advance to an actual *Flame.*

Exploſion *and* Accenſion *made in* Vacuo. *Ib. p.* 212.

I ſhall venture here to add one ſurpriſing Effect of this *fiery* Mixture, which was done in the Preſence of ſeveral Spectators.

We took *half* a *Drachm* of the *Oil* of *Carvi-ſeeds*, and poured it into a little Gally-pot, and placed over it a Glaſs that held 3 Pints, upon Monſieur *Papin*'s *exhauſting Engine*; and having ſoon cleared it of the *Air*, we turned up the Phial, in order to ſee what Effect would enſue, in this Sort of *Vacuum*, upon this Mixture: But, in the twinkling of an Eye, the *Receiver* was *blown up*, and the Mixture in a *Flame*; which ſtupendous Phænomenon ſurpriſed and frightened us all: Nor did I ever ſee or hear of the like by any Mixtures made *in Vacuo*, though I have myſelf ſeen a Thouſand. For if we look into theſe many and admirable Experiments made by the immortal Mr. *Boyle*, the Removal of the *Air* did almoſt always extinguiſh *Light*, and *Fire*, and *Flame*.

The *Blowing up* of the Glaſs does alſo make the Experiment the more aſtoniſhing, and puzzles one how to account for ſo great a Quantity of *Air* as was produced from theſe Liquors, which amounted only to a *Drachm* and *half*; for here was required not only *Air* enough to fill up the Capacity of the Veſſel, but alſo there was required ſo great a Preſſure within as did exceed that great incumbent Weight of the Air that preſſed upon this capacious Glaſs without (whoſe Diameter was 6 *Inches*, and the Depth above 8), for otherwiſe it would not have thrown it up into the *Air*.

If we review and conſider well the Phænomena of this Experiment, we may find the Reſiſtance of ſome hundred Weight that was countervailed; and not only ſo, but with a much greater Force *exploded*.

That it was not produced by an Expanſion of the common *Air*, for that was ſeen to riſe out of the Liquors themſelves, and was drawn out of them in their ſeparate State, by the *exhauſting Engine*, which ſuffers no *elaſtick Air* to lie concealed in Liquors.

That it was produced in an Inſtant, by the mutual Colliſion and Agitation of theſe active and ſelf-expanding Liquors.

That it was not abſolutely generated *de Novo*, but that the *Air* was antecedently there, we may reaſonably believe, although in a very differing State from what it is in when *in pleno*. For all that the *exhauſting Engine* does, is to deliver the *Air* from a State of Compreſſion, by leaving it to ſtretch itſelf like a Bladder, that has full Liberty to ſwell up, and has no hard Body to ſtrengthen or oppoſe its Expanſion: So that we have Cauſe to conclude our Liquors to be furniſhed with this ſort of *Air*, which, being by the *Accenſion* of theſe two Liquors put to a new and violent Motion, do expand themſelves *de Novo*, and to that Degree, as to anſwer ſo great an Effect as is above-mentioned.

5. The Circumſtance of which Phænomenon will allow me to call this Mixture a ſort of *liquid Gun-powder*, which brings me to make a Compariſon betwixt *Gun-powder* and the *fiery Mixture*.

Theſe

A Compariſon betwixt Gun powder *and this* fiery Mixture. *Ib. p.* 213.

Theſe *Phænomena* agree, in that both do *heat*, and *burn*, and *flame*; and alſo do conſiderably reſiſt and raiſe up Bodies that do oppoſe them. In both, the *Air* is much agitated and *expanded*: For in *Gun-powder* you have much *Air* coil'd up and included in Particles of *Nitre*, which the *Brimſtone* and *Charcoal*, by their ſudden *Accenſion*, do violently expand and ſwell to that Degree, that, like a Storm of Wind, it bears every heavy and reſiſting Body before it, eſpecially when it is compreſſed or reſtrained within juſt Bounds.

The Experiment juſt above-mentioned can only account for that *Exploſion*, by charging it to ſome little concealed *Air* our *fiery Mixture* expanded; inſomuch that I doubt not, that if a Way were invented (which ſeems to me not impracticable) to make it go off as *Powder* does out of a *Gun*, it would *project* a heavy Body a great way.

We further made an Experiment *in pleno*, or after this manner.

We put a ſmall Quantity of the *Oil* in a Gally-pot, and ſome of the *Spirit* in an open Glaſs, and fixed a Plate of Copper upon the Gally-pot, ſo as to cover it pretty exactly, and then ſet a Weight upon the Plate, and pulling a String, made the *Spirit* to mix with the *Oil*, which did at that Inſtant *blow up* the Cover, and throw off the *Weight*.

But though it doth in ſome Reſpects agree with *Gun-powder*, yet in others you ſee a great Diſparity; for *Gun-powder* will not be made to take *Fire*, or make any *Exploſion in Vacuo*, both which this Mixture performed with the ſame Celerity it did in the *Air*.

Vide Par. II. *Cap.* I. *Sect.* LXXIX.

Gun-powder is a Compoſition of the moſt *dry* and combuſtible Materials we can pack together; in our Mixture of two *Fluids*, one of them is not eaſily made to *burn* by itſelf, and the other will extinguiſh common *Fire*.

Gun-powder requires actual *Fire* to bring it to an *Accenſion*, whereas in this you have only two Waters or Liquors, both *cold* to the Touch, that do produce *Fire* and *Flame* by the bare joining and mixing them together.

And now we will conclude this Experiment; only taking notice of the *Caput Mortuum* (as *Chymiſts* call it), or what remains after the *Accenſion* is over; which ſeems to be ſomething uncommon.

In caſe you have adjuſted the Proportion of *Spirit* to the *Oils* exactly well, you will not fail to make the Mixture *flame*: And upon the *Extinction* of the *Flame* you will have a light and blackiſh Subſtance, which will indeed vary both as to the Bulk and Complexion, according to the Difference of the *Oils*. But in this they all agree, namely, to leave behind a ſpungy and exceeding light Matter, and perfectly *inſipid*. Sometimes it ſwells up into a great Protuberance, and as big as a Man's Fiſt above the Gally-pot; and if you *taſte* it (which you may ſafely do) and macerate it in your Mouth, you will find it to be as *taſteleſs* as Paper, or even Paper when burnt to Aſhes. Inſomuch that we may ſafely conclude, that by this powerful Mixture a third *ſolid* Body reſults, abſolutely differing from either of the two mentioned *Liquors*: And which makes it the more remarkable, that both theſe *Fluids*, which have ſo great an Impreſſion upon the Organs of *Smell*, and a very great one on the Organs of *Taſte*, ſhould in an Inſtant be deſtroyed, and terminate in a *dry inſipid Caput Mortuum*, which will not melt in the *Air*, nor be diſſolved by *Water*, nor other corroſive *Menſtruums*, but remains as much a *Caput Mortuum* as a Piece of Paper, or a Rag burnt to Aſhes, if not much more.

Upon a Review of the Whole, this Experiment will poſſibly not only ſurpriſe and amuſe ſome, but pleaſe and delight others; and not only ſo, but perhaps afford ſome Inſtruction to a Philoſophical Genius. By this the Power of *Motion*, in order to the producing thoſe great Effects of *Heat*, *Fire*, *Flame* and *Light*, may be conſidered; the Nature of *Oils* ſomewhat examined and diſtinguiſhed; the Productions of new Bodies by the Power of Mixture repreſented; and I hope, in time, ſome mechanical Uſe made of it, at leaſt it is heartily wiſhed ſo.

R. S. *Vid. Sup. Sect.* XVII. Mr. *Molt*, a moſt ingenious Chymiſt, and deſervedly a *Fellow* of the *Royal Society* (to whom I muſt acknowlege an Obligation for the liberal Uſe he allowed me of his great and excellent Collection of *Eſſential Oils*) affirms to me, that he hath ſometimes made *Oil* of *Turpentine* take *Fire*: But yet it proves ſo hard a matter to bring it to an *Accenſion*, that he is always doubtful of the Succeſs.

I know, that if a *Candle* be brought any thing near the *Smoke* raiſed by this Mixture, then the *Oil* will certainly take *Fire* from the *Flame* of the *Candle*. Not but that I am glad of this or any Opportunity to do Juſtice to the Memory of the famous *Borrichius*, who has printed an Experiment of this ſort in the *Acta Hafnienſia*.

Mr. *Mott* did alſo inform me, that *Spirit* of *Wine* would give a *Flaſh* of *Light* with this *Compound Spirit*, but not *burn*; and he has obſerved the ſame Circumſtance in his Experiment, which I did formerly (in the Year 1683), that if you put your *Spirit of Wine* to that of *Nitre*, you will have a great *Effervescence* immediately enſue; but if you invert the Order, and put the *Spirit* of *Nitre* on the *Spirit* of *Wine*, you will not have any *Ebullition* for ſome time: But this Circumſtance is quite contrary to all the other Experiments we have made about the *Oils*.

That the *Spirit* of *Wine* does not take *Fire*, ſeems to proceed from the ſame Impediment, which hinders *light Oils* from coming up to an *Accenſion*, becauſe they are ſo ſuddenly thrown off; and there ſeems to be a great Analogy betwixt *æthereal Oils* and the *Spirit* of *Wine*, both as to *ſpecifick Gravity*, and as to all other Properties; *Spirit* of *Wine* ſeems to be a more thin and diluted *eſſential Oil*, that contains ſome *Water* and more *Air* in its Pores; they ſeem to own the ſame material Cauſe: For if you diſtil an *eſſential Oil* out of any *Seed*, you ſhall not then be able to produce any *Spirit*, and *Vice Verſa*, if you diſtil off the *Spirit*, no *Oil* will follow. There is alſo a great Affinity in Texture; for the *Spirit* and *Oil* do eaſily unite and mix together, eſpecially if the *Spirit* be highly *rectified*, and have leſs of *Water* or other heterogeneous Matter in it; as any one may find, if he will take the Pains to ſhake a true *eſſential Oil* with *Spirit* of *Wine* a good Proportion of the former will incorporate with the latter.

A clear ſulphureous Spirit, which being mixed with a volatile Alkali, *gives a* red Colour; *by Mr.* Edw. Coles. *n.* 228. 542.

XIX. I have found a *ſulphureous Spirit*, which being mixed with a *volatile Alkali*, ſuch a *Spirit* of *Sal Armoniac*, or *Urine*, &c. gave it a *red Colour* in a Moment. I make the *Spirit* by *diſtilling* 2 or 3 Pounds of *Benzoin* with a little Sand in a *Retort*, *ad Siccitatem*, and put the *Oil*, *Spirit*, and *Flowers* all together into a Paper *Filtre*, and the *Spirit* comes *firſt* through. You may put two Parts of this *Spirit* to *one* of *Spirit* of *Sal Armoniac*, and ſhake the Glaſs or Bottle, and it will be *red* in a Moment, though both the Liquors were clear before; and the more the Glaſs is ſhaken, the deeper or blacker *Red* it will be. It produces this Effect without any *Effervеſcence*. This Experiment may, perhaps, be ſerviceable in the demonſtrating of *Sanguification*.

Two clear inflammable *Liquors, which being mixed, give a* Carnation Colour; *by Mr.* Geoffery. *n.* 249. *p.* 43.

XX. To make the *firſt* of theſe Liquors, put a ſmall Handful of *dried red Roſes* into a Glaſs Bottle, pour on them *rectified Spirit* of *Wine*, till it cover them an Inch. Let them infuſe in the Cold all together in the Bottle for 4 or 5 Hours, then pour off the *Spirit* of *Wine*, which will be *clear*, and have no Colour.

This *ſecond* Liquor is made by putting into ſome good *Spirit* of *Wine* ſome Drops of good *Spirit* of *Vitriol*, or *Oil* of *Sulphur*, ſo that ſcarce can the *Acid* or Sour be diſcovered by the Tongue.

If you put a little of this *laſt* Liquor into the *firſt*, it will give a fine *reddiſh Colour*, without any *Effervеſcence*, or other ſenſible Alteration.

If, inſtead of this *Wine* mixed with *Acids*, you put to the *firſt* ſome Drops of any *volatile Alkalies*, as of *Spirit* of *Sal Armoniac*, or other, it will give a *green Colour* to the Infuſion.

A ſtrangely ſelf-moving *Liquor*; *by Mr.* Robert Boyle. *n.* 170. *p.* 1188.

XXI. An ingenious Teacher of *Mathematics* having Occaſion to make a Compoſition for a new *Fire-Engine*, whereof he was to ſhew his Majeſty a Trial, mingled divers Ingredients in an earthen Pot, over kindled Coals; but could not, or did not, do it ſo warily, but that the Matter took Fire, and began to blaze furiouſly; which obliged him to ſtifle the Flame as haſtily as he could: And having removed the Veſſel from the Fire, and ſuffered it to grow cold, when afterwards he came to look upon it, to ſee if what remained might be of any Uſe to him, he was ſurpriſed to find it variouſly and briſkly *moved*. Wherefore having ſet it aſide, and to be ſure that it might be thoroughly cold, he, after ſome Hours, viſited it again, and found it *move* as before. And having caſt Store of Seeds upon it, to ſee if the Liquor would move them alſo, the bituminous Part of it connected them into a kind of thick Scum, that covered moſt of the Superficies; but yet left ſome Intervals, in which the Liquor appeared, and diſcovered, that it continued its *Motions*. Two Days after, the Engineer diſcourſing with me of his *Fire-work*, about which he had adviſed with me before, told me, among other things, of this odd Accident. And when I had aſked him, if the *Motion* continued ſtill, and had been anſwered affirmatively,

tively, my Diffidence or my Curioſity made me engage him to ſend for the Pot, as it was; partly to be ſure of the Matter of Fact, and partly to try if the Knowlege I had of the Ingredients, which he had before told me, would afford any Hint of the Cauſe of ſo odd an Effect; alike to which in Kind, though not in Degree, I had many Years before deviſed, and ſucceſsfully practiſed the Way of producing.

The Veſſel being come, there did appear manifeſt Signs of ſuch *Motion* as the Engineer had aſcribed to it; and therefore I cauſed it to be ſet aſide in a *Laboratory*, where ſome *Furnaces* kept the Air conſtantly warm, and did there and elſewhere, at diſtant Times, look heedfully upon it, now and then diſplacing, or quite taking off ſome of the thick Scum, that too much covered the Surface of it; and by this Means I had the Opportunity to take notice of ſeveral Phænomena, whereof theſe are the chief:

1. I obſerved, that the *Motion* of this Liquor was not only briſk, but very various; ſo that, having looſened ſome ſmall Portions of the Scum from the reſt, one of them would be carried towards the Right Hand, for Inſtance, and another toward the Left, at the ſame Time. 2. Where the Liquor came out firſt from under the Scum, it ſeemed to move the moſt briſkly, flowing almoſt like a Stream, whoſe *Motion* upwards had been checked, and as it were reverberated by that incumbent Obſtacle. 3. Several *Motions* in this Liquor were the more eaſy to be obſerved; becauſe though it were dark, yet it was not uniform, conſiſting in Part of *oily* and *bituminous* Ingredients, which though they ſeemed to have but one common Superficies with the reſt of the Liquor, yet by their Colours and Power of vigorouſly reflecting the Light, they were eaſily enough diſtinguiſhable from the reſt. And I often obſerved, that ſome of the *unctuous* Portions of the Matter, emerging to the Surface of the Liquor, though perhaps at firſt one of them would not appear bigger than a Pin's Head; yet, in the *moving* forwards, it would at the ſame time *diffuſe* itſelf circularly, and make as it were a great *Halo*, adorned with the *Colours* of the *Rain-bow*, and ſo very vivid, as afforded a very pleaſant, and at firſt ſurpriſing Spectacle: Theſe Phantaſms often nimbly ſucceeded one another, and laſting till they loſt themſelves againſt, or under the thick Scum. 4. The *Motions* of this odd Liquor were not only various, but frequently *vortical:* To be ſatisfied of which, I ſometimes put ſhort Bits of Straw, or Fragments of ſome ſuch like Stuff, upon the diſcovered Part of the Surface of the Liquor, by which they were carried towards very diſtant, if not oppoſite Parts of the Veſſel at the ſame time. But to make the *vortical Motion* more evident, I ſeveral times detached conſiderably large Pieces of the thick Scum from the reſt of the Body, and had the Pleaſure to ſee them *move* both with a progreſſive *Motion* in crooked Lines, and with a *Motion* about their own middlemoſt Parts. All this while the Liquor, whoſe Parts were thus briſkly *moved*, was actually *cold* as to Senſe. 5. To obſerve what the Preſence or Abſence of the *free Air* would do to this Liquor, I cauſed many Spoonfuls of it, with ſome of the Scum, to be put into a cylindrica Glaſs, which, though large itſelf, had a Neck belonging to it, that was b about the Bigneſs of one's Thumb, that it might be well ſtopped with a Cork

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But having by this means kept the *free Air* from having a full and immediate Contact with the whole Surface of the Mixture, as it had when that Mixture lay in the wide-mouthed Veſſel; I could not perceive the Liquor to *move* to and fro, no not though the Orifice of the Neck were left open; whereas, having at the ſame time poured ſome of the Liquor into a very ſhallow and wide-mouthed Veſſel, called, in the Shops, a clear caked Glaſs, it *moved* rather more than leſs nimbly and variouſly than in the great earthen Pot (which yet was of the ſame Shape), and ſhewed us many of thoſe *vivid* and *ſelf-dilating Circles*. 6. Though the *Motions* of the Liquor did not ſeem to be always equally briſk, yet they appeared to continue manifeſt and various in ſome Diverſities of *Weather*, as to *Cold* and *Heat*, and when I looked on it by the Candle Light, as well as by Day Light.

I kept ſome Spoonfuls of this Liquor cloſe ſtopp'd in a Phial, and by this means I had the Opportunity to obſerve, that when I poured out the Liquor into a wide-mouthed Veſſel it would *move* as before, though this were done ſome *Weeks* after it had been put up. About the Beginning of *June*, that is about five *Months*, or more, after the Liquor was firſt obſerved to *move*, to gratify the Curioſity of a *foreign Miniſter*, and that of ſome other ingenious Men then preſent, I cauſed the Phial to be brought; and having unſtopp'd it, I poured out the Liquor in a conveniently ſhaped Veſſel; in which, after we had ſuffered it to reſt a while, they were delightfully ſurpriſed to ſee it *move* (though not, in my Opinion, quite ſo briſkly as before, yet) very manifeſtly and variouſly. This encouraged me to think it poſſible, that it might retain ſome *Motion*, tho' but languid, 7 or 8 *Weeks* after; and therefore, on the 25th of *July*, I looked upon it again; and having cauſed it to be poured into a China Cup, it manifeſted at firſt a briſk and various *Motion*: But this, after a while, did ſo ſlacken, that I began to have ſome *Suſpicion*, that the *Motion* it was put into by Effuſion, and the firſt Contact of the Air, might have given it the greateſt Part of its Agitation; but this was only *Suſpicion*.

XXII. *A Paper of leſs general Uſe* omitted; *viz.*

A Factitious ſtony Matter or Paſte, *ſhining* in the *Dark* like a glowing Coal, after it hath been a little while expoſed to the *Day* or *Candle Light*; invented by *Chriſt. Adolphus Balduinus*, and preſented by him to the *King*, and to the *Royal Society*. *n.* 31. *p.* 788.

XXIII. *Accounts of Books* omitted.

1. *PHarmacologia*, ſeu Manuductio ad *Materiam Medicam*; in qua Medicamenta *Officinalia* Simplicia, hoc eſt *Mineralia*, *Vegetabilia*, *Animalia*, eorumque Partes, in Medicina Officinis uſitata, in Methodum naturalem Digeſta ſuccinctè & accuratè Deſcribuntur, cum Notis Generum Characteriſticis, Specierum Synonymis, Differentiis & Viribus. à *Sam. Dale*. *n.* 204. *p.* 925.

2. *Medicina*

n. 192. p. 488. 2. *Medicina Hydroſtatica*, or *Hydroſtaticks* applied to the *Materia Medica*; ſhewing how, by the Weight that divers Bodies uſed in *Phyſick* have in Water, one may diſcover whether they be *genuine* or *adulterate*; by the Honourable *Rob. Boyle*. *London*, 1690, in 8*vo*.

n. 76. p. 2287. 3. *Dan. Ludovici*, Medici *Ducal. Saxo Gothani*, de *Pharmacia* Moderno Seculo applicanda, Diſſertationes Tres. *Gothæ*, 1671, in 12*mo*.

n. 60. p. 4087. 4. *Hermanni Grube*, M. D. Commentarius de Modo *Simplicium Medicamentorum* Facultates Cognoſcendi. *Hafn.* 1669. in 8*vo*.

n. 85. p. 5023. 5. A rational Way of preparing *Animals*, *Vegetables* and *Minerals*, for a *phyſical* Uſe; by *Edw. Bolneſt*, Med. Reg. Ord. *Lond.* 1672, in 12*mo*.

n. 75. p. 1176. 6. *Pharmacopæia Regia*, ſive *Diſpenſatorium* Novum Locupletatum & Abſolutum, cum annexa Mantiſſa *Spagyrica*, & Gemino Diſcurſu Apologetico contra *Ott. Tachenium*, & *Franc. Vernis*. Auth. *Joh. Zwelſer*, M. D. 1668, in *Fol.*

n. 123. p. 709. 7. *Pharmacopee Royale*, *Galenique* & *Chymique*, par *Moyſe Charas*, à *Paris*, 1676, in 4*to*.

8. The *Royal Pharmacopæia Galeno-chymical*, according to the Practice of the moſt eminent and learned Phyſicians of *France*, and publiſhed with their ſeveral Approbations; by *Moſes Charas*. In *Engliſh*.

n. 133. p. 833. 9. *Pharmacopæia Collegii Regalis*. *Lond.* 1677, in *Fol.*

n. 206. p. 1000 10. *Pharmacopæia Bateana*; or, *Bates*'s *Diſpenſatory*, tranſlated into *Engliſh* by *Will. Salmon*. *Lond.* 1694, in 8*vo*.

n. 264 p. 612. 11. *Pharmacopæia Harlemenſis*, Senatus Authoritate munita. *Harlemi*, 1693, in 12*mo*.

n. 52. p. 1058. 12. Hiſtoire Naturelle des *Animaux*, *Plantes*, & *Mineraux*, qui entrent dans la Compoſition de la *Theriaque* D' *Andromachus*; par *M. Charas*. A *Paris*, in 12*mo*.

n. 74. p. 3237. 13. De *Laudano Opiato*, Auth. *Matth. Tillingio*, M. D. *Francofurti*, 1671, in 8*vo*.

n. 99. p. 6166. 14. *Pharmaceutice Rationalis*, ſive Diatriba de *Medicamentorum Operationibus* in Humano Corpore: Auth. *Tho. Willis*, M. D. *Oxon.* 1673, in 4*to*.

n. 39. p. 779. 15. *Olai Borrichii*, Med. Reg. de Ortu & Progreſſu *Chemiæ* Diſſertatio. *Hafniæ*, 1668, in 12*mo*.

n. 50. p. 1019. 16. *Ottonis Tachenii Hippocrates Chymicus*. *Venetiis*, in 12*mo*.

n. 135. p. 886. 17. A new Treatiſe of *Chymiſtry*, &c. Written in *French* by *Chriſt. Glaſſer*, and now faithfully *engliſhed*, by *F. R. S. Lond.* 1677, in 8*vo*.

n. 175. p. 1183 18. A Courſe of *Chymiſtry*; by *Nic. Lemery*, M. D. tranſlated from the French, by *Walter Harris*, M. D. *Lond.* 1686.

n. 175. p. 1186 19. *Officina Chymica Londinenſis*. Opera & Studio *Nicolai Staphorſt*. *Lond.* 1685, in 12*mo*.

n. 136. p. 900. 20. The curious *Diſtillatory*, &c. Written originally in *Latin* by *Joh. Sigiſm. Elſholt*, and *engliſhed* by *T. S.* M. D. *Lond.* 1677, in 12*mo*.

n. 29. p. 555. 21. Synopſis *Novæ Philoſophiæ* & *Medicinæ*, *Franciſci Travagini*, Medici *Veneti*.

22. *Hermetis Ægyptiorum* & *Chemicorum* Sapientia, ab *Hermanni Conringii* Animadverſionibus vindicata, per *Olaum Borrichium*; *Hafniæ*, 1674, in 4*to*. n. 113. p. 296.

23. *Davidis vander Beck*, *Mindani*, Experimenta & Meditationes circa Naturalium Rerum *Principia*, &c. *Hamburgi*, 1674, in 8*vo*. n. 103. p. 60.

24. Epiſtola ad D. *Joelem Langelotum*, de *Alcali* & *Acidi* Inſufficientiâ ad gerendum Munus *Principiorum* Corporum Naturalium: Conſcripta à *Joh. Bohn*, M. D. *Lipſiæ*, 1675, in 8*vo*. n. 117. p. 407. n. 145. p. 110.

25. *Zymologia Chymica*; or, a philoſophical Diſcourſe of *Fermentation*, from a new Hypotheſis of *Acidum* and *Sulphur*; with an additional Diſcourſe of the *Sulphur Bath* at *Knarsborough*; by *W. Sympſon*, M. D. *Lond.* 1675, in 8*vo*. n. 117. p. 410.

26. Philoſophical Dialogues concerning the *Principles* of natural Bodies; by *W. Sympſon*, M. D. *Lond.* 1677. n. 135. p. 883.

27. De Figuris *Salium*; by *S. Redi*. n. 8. p. 145.

28. *Georgii Wedelii*, M. D. Specimen Experimenti novi, de *Sale Volatili Plantarum*. *Francofurti*, 1672, in 12*mo*. n. 100. p. 7000

29. Tractatus 5 Phyſico-Medici de *Sale-Nitro* & *Spiritu Nitro-Aereo*, &c. Auth. *Joh. Mayow*, LL. D. *Oxon.* 1674, in 8*vo*. n. 105. p. 101.

30. *Jac. Barneri*, D. *Spiritus Vini* ſine *Acido*, &c. Demonſtratio Curioſa. n. 145. p. 111.

31. The *Chymical Touchſtone* of M. *Joh. Kunkle*. De *Acido* & *Urinoſo Sale* Calido & Frigido, contra Doctor. *Voights Spir. Vini* Vindicatum, *Berlin*, 1684. n. 168. p. 896.

32. Tractatus de *Salis Cathartici Amari* in Aquis *Ebeſhamenſibus* & hujuſmodi aliis contenti Naturâ & Uſu. Auth. *Neh. Grew*, M. D. *Lond.* 1695, in 12*mo*. n. 216. p. 76.

33. Il *Foſforo*, overo la *Pietra Bologneſe* Preparata per reluvere fra l'ombre Fratica di *Marc. Antonio Cellio*. In *Roma*, 1680. Phil. Col. n. 3. p. 77.

34. Diſſertatione Epiſtolare del *Foſforo Minerale* oſio della *Pietra Illuminabile Bologneſe*, à Sapienti ed Eruditi Signori *Colletori* degli *Acta Eruditorum* di *Lipſia*, Scritta da *Luighi Ferdinando Conte Marſigli*, &c. *Lipſ.* 1698, in 4*to*. n. 243. p. 306.

The End of the Firſt Part.

THE
Philological and *Miſcellaneous Papers,*
PUBLISH'D and DISPERS'D in the
Philoſophical Tranſactions,
AND
COLLECTIONS,
ABRIDG'D and DISPOS'D under
GENERAL HEADS.

CHAP. I.
PHILOLOGY.

GRAMMAR.

I. HAVING obſerved a great Difficulty in truly *writing* what is pronounced, or truly *pronouncing* what is written, either in our own or foreign Languages, by the ordinary *Alphabets* now in Uſe, ariſing either from the want of ſome Letters, or the differing Pronunciation of the ſame Characters or Letters in differing Languages, and the Irregularities of its various Sounds in any one Language, I ſaw a Neceſſity of ſome ſuch Expedient as I have here attempted, *viz.* An *Univerſal Alphabet*, which ſhould contain an Enumeration of all ſuch ſingle Sounds or Letters as are uſed

An Eſſay towards an Univerſal Alphabet; *by Mr.* Lodwick. *n.* 182. *p.* 126.

uſed in any Language. By the Help of ſuch a Collection being perfect, 1. Children from their firſt Beginning, being taught and accuſtomed to the true Expreſſion of all theſe ſingle Sounds or Letters, will, without Difficulty, be brought to *pronounce* truly and readily any Language. 2. Any one accuſtomed to the true *Pronunciation* of this *Alphabet* will be enabled to *deſcribe* the *Pronunciation* of any Language whatever, that ſhall in his Hearing be diſtinctly pronounced; ſo as another alſo accuſtomed to this *Alphabet*, although he before never had heard this Language pronounced, ſhall notwithſtanding at firſt Sight of ſuch *Writing*, be able ſo truly to pronounce it, that it ſhall (if at all) very little differ from the original Pronunciation. 3. This *Alphabet* will alſo be uſeful to *perpetuate* the true Sounds of any Language, and ſerve as a Standard thereof to After-ages: For if all the ſingle Sounds expreſſible be here *characterized*, and that no one *Character* have more than one *Sound*, nor any one *Sound* be expreſſed by more than one *Character*, it cannot fall out that any *Character* ſhould be *falſly pronounced*, but it will ſoon be diſcovered; for this *falſe Sound* he giveth it muſt be the *true Sound* of ſome other *Letter* of this *Alphabet*.

In this Collection I proceed according to theſe Rules. 1. That no true *ſingle* Sound can be truly deſcribed or expreſſed by the Conjunction of any two or more other ſingle Sounds; *viz.* If a *Vowel*, by the Conjunction of other *ſingle Vowels*, or if a *Conſonant*, by the Conjunction of other *ſingle Conſonants*.

2. That whatever Sound cannot be expreſſed or deſcribed but by the Conjunction of two or more ſingle Sounds, is no *ſingle*, but a *compounded Sound*.

3. That in every *Compoſition* of *ſingle Sounds*, the particular ſingle Sounds which make up that Compoſition ought to be truly and clearly diſcerned in the *Sound* of the *Compoſition*, otherwiſe it cannot truly be ſaid to be a *Compoſition*, and compoſed of ſuch *ſingle Sounds*.

The *ſingle Sounds*, uſually named *Letters*, are commonly diſtinguiſhed into *Vowels* and *Conſonants*. *Vowels* are ſuch as are *ſingly* expreſſible, as *a*, *e*, *i*, *o*, &c. *Conſonants* are ſuch as cannot *ſingly* be expreſſed without the Conjunction of a *Vowel*, as *b*, *d*, *f*, *g*, &c.

The whole Number of *Vowels* are theſe 14 following; to which, for the better diſcerning of their *Sounds*, I have annexed ſo many Words wherein they are expreſſed, all *Engliſh* but 3, *viz.* 7, 8, 12; becauſe no *Engliſh* Words occurred to my Memory, wherein they are expreſſed.

1 a *as* Tall
2 a Tallow
3 a Tale
4 e Tell
5 ea Teal
6 i Till
7 u Dune, *French*
8 ui Muis, *Low-Dutch*
9 y Tile
10 o Tone
11 u Tunne
12 u Une, *French*.
13 oo Tool
14 ou Could.

Theſe are the *Vowels*, each of which are *long* and *ſhort*: *Short* as in the Words, *God*, *Man*, *Sin*; *long* as in *Ball*, *Demand*, *Seen*, &c.

A *Dipthong*, in the ordinary Uſe of the Word, ſignifies a Compound of *two Vowels*; but thoſe in ordinary ſo named, are moſt of them nothing but only *ſingle Vowels*, as *ea*, *oo*, *eo*, *ai*, in the Words, *Teal*, *Fool*, *could*, *People*, *Main*, &c. That theſe are but *ſingle Sounds*, will appear, if we conſider the Sounds of the *Vowels ſingly*, that make thoſe ſuppoſed Compoſitions; and then whether thoſe Sounds in Compoſition will make out the true Sound required, ſo as both of them may be *clearly diſcerned* in theſe pretended *Compounds*. For inſtance, in *ea* in *Teal*; conſider the Sound of *e* in the Word *ſent*, or in the Word *Scene*; and *a* in the Word *Ball*, or in the Word *and*, or in the Word *Tale*; and then whether *e*, in either of the two Sounds going before, and *a* in either of the three Sounds following, joined together, will make out the true Sound of *ea* in the Word *Teal*: If not, then it is a *ſingle Sound*. Thus, if you proceed to examine all the other, you will, I doubt not, find the ſame Event, and, I believe, the true *Dipthongs* and *Tripthongs* of the *Greeks* were no other, but a true Expreſſion of the *ſingle Vowels* they joined together, but in ſo ſhort a time, as both or all three were expreſſed in the time that ordinarily one ſingle Vowel was expreſſed.

The whole Number of *Conſonants* are theſe under-mentioned, as nigh as I could collect by examining all the Languages I am acquainted with, or have heard expreſſed: And I think few, if any *ſingle Conſonants* have eſcaped my Notice, all which, in this following Table, I have ranged in 11 *Files*, and 6 *Ranks*.

	1	2	3		4		5	6
1	B. Bond.	D. Dark.	J. Jeſt.		G. Game.		=	=
2	P. Pond.	T. Tart.	Ch. Cheſt.		K. Came.		=	=
3	M. Mind.	N. Name.	gn. Seignior.	} *Fr.*	ng. Song.		=	=
4	=	dh. This.	J. Jean.		g. Gaen.	} *L. D.*	V. Valley.	Z. Zeal.
5	=	th. Thing.	ſh. Shall.		ch. Dach.		Folly.	S. Seal.
6		n. Danſe. *Fr.*						

	7	8	9	10	11	
1	L. Lane.	H. Hand.	Y. Yarn.	R. Rand.	W. Wand.	*Fr.* ſignifies *French.*
2						*L. D. Low-Dutch.*
3						*W. Welſh.*
4						
5	lh. *W.*					
6						

The *firſt File* contains 3 *Conſonants*, the *ſecond* 6, the *third* and *fourth* 10, the *fifth* and *ſixth* 4, the *ſeventh* 2, the remaining *four* each 1; in all 29 *Conſonants*.

The *ſecond Rank* in each *File* contains *Derivatives* [ſo I ſhall name them], in relation to the *firſt Rank*, or their *Primitives*, all alike in kind; ſo alſo all the *Derivatives* in the 3*d*, 4*th*, and 5*th Ranks*, whereby their Sounds will be comprehended.

Thoſe Places filled with two Strokes (=) ſignify, that *Sounds* may be expreſſed by the ſame *Poſture* of the *Mouth* with their *Primitives*, anſwering in kind to thoſe in the ſame *Rank* wherein they ſtand; but they would be ſo like in *Prounciation* to ſome others in the Table, that the Difference would be too nice for common Diſcernment; and alſo for that I have not obſerved them uſed in any Language I have heard expreſſed by a perfect Mouth, I thought it needleſs to characteriſe them.

As thoſe of the *4th* and *5th Rank* in the *1ſt File* are like thoſe of the *4th* and *5th Rank* in the *5th File*, and thoſe of the *1ſt*, *2d* and *3d Ranks* in the *5th File*, are like thoſe of the ſame *Ranks* in the *1ſt File*, ſo thoſe of the *1ſt*, *2d*, *3d Ranks* in the *6th File*, are like thoſe of the ſame *Ranks* in the *2d File*.

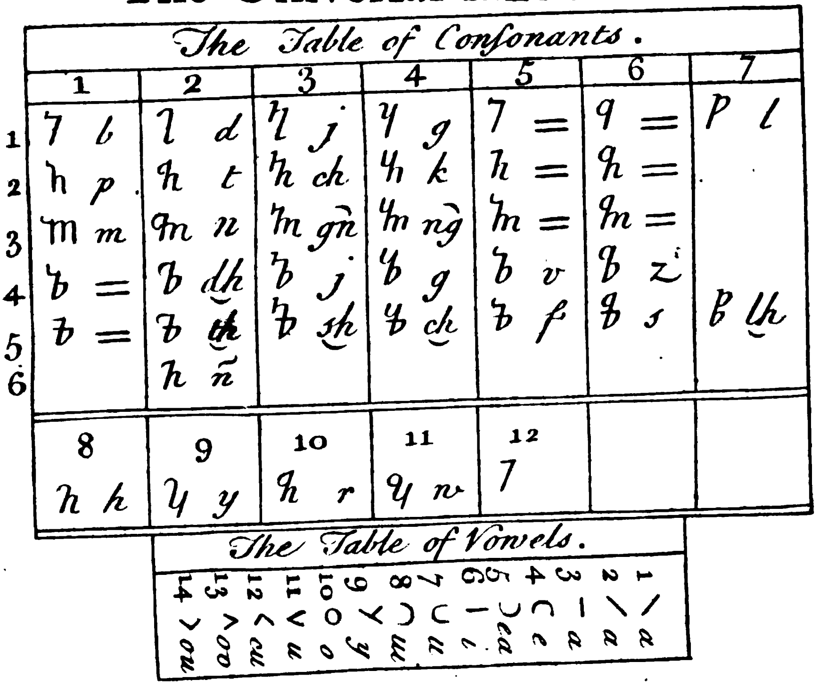
Some of theſe above-mentioned 29 *ſingle Conſonants*, are vulgarly ſuppoſed *compounded*, as *th*, *ch*, *ſh*, *gn*, *ng*, &c. But if you conſider the Sound of each *ſingle Conſonant* in the Compoſition apart, and then the *Conjunction* of them in that Order, ſo as the *ſingle Sounds* may be clearly diſcerned in the Compoſition, you will never make the *Sounds* required: And if neither by this nor by any other *Conjunction* the required *Sound* can be made out, it muſt be a *ſingle*, and no *compound Sound*.

All *ſingle Sounds* ought to have *ſingle* and *diſtinct Characters:* But it will be impoſſible in the Uſe of the preſent *Characters* or *Alphabets*, to add thoſe wanting, and to correct and limit the Sound of others in Uſe, thereby to conſtitute a *perfect Alphabet*, becauſe People, ſo long accuſtomed or habituated to the corrupt and differing Expreſſions of the preſent *Characters*, will be always ſubject, on the Sight of the old, to give them thoſe *Sounds* they have been uſed to, and to *ſpell* Words according to their old and corrupt Cuſtom, whatſoever Rules ſhall be ſet to the contrary. I have therefore, in the following *Table* given a new Set of *literal Characters*, both *Conſonantal* and *Vocal*. The Set of *Conſonantal* are ranged in the ſame Method and Order with thoſe in the foregoing Table. The *firſt Rank* in every *File* are thoſe I name *radical Characters*; the other ſucceeding *Ranks* have each a diſtinct *characteriſtical* Addition to diſtinguiſh them one from another, which cauſeth ſome Complication: But yet I judged it neceſſary to expreſs the ſame in the *Character*, the more regularly to ſort them into Claſſes, and to expreſs the *Derivation* of *Letters* of the ſame *Organ*, the one from the other.

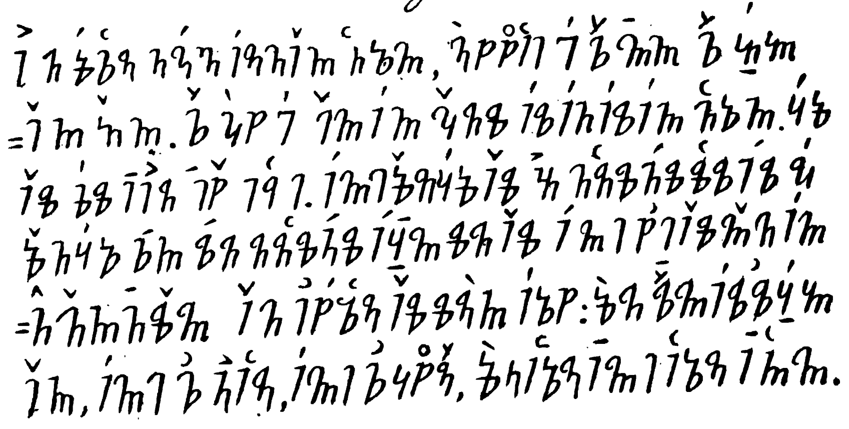
The Set of *vocal Characters* is like~~wiſe in the ſame Table.~~ In Writing they are to be placed over the *Conſonants*, which they follow in Expreſſion; and whereas ſome *Syllables* begin with a *Vowel*, place the *12th conſonantal Character* anſwering to the *Hebrew Aleph*, and over the ſame place the *Vowel* beginning ſuch a *Syllable*. To diſtinguiſh the *long Vowel* from the *ſhort*, add a Prick to the *vocal Character*. The 9, 11, 12, 13, *14th vocal Characters* are (for want of ſingle Strokes) compounded of the *firſt* and *ſecond*. The *Dipthongs* truly ſuch (as I have before noted) may be made by the Conjunction of the *ſingle Vocal Characters* in Order as they follow, and will be eaſily diſtinguiſhed from the five foregoing *compounded Characters* of the *ſingle Vowels*, becauſe there will not likely occur any *Diphthong*, compounded of the *firſt two Vowels*.

The *Accent* may be a thwart Line under the *Syllable* that is to be *accented*. The 4 Marks of *Pauſes* ordinarily uſed, namely , ; : . may be continued. The *Characters* ſignifying the various *Modes* of *Expreſſion* may be theſe following, and ought to be placed at the Beginning and End of every Sentence requiring it. [ ] *Explications*. ( ) *Parentheſis*. ¡ ¡ *Emphaſis*. ? ? *Interrogation*. ! ! *Wonder*. ¿ ¿ *Irony*.

The Univerſal ALPHABET.


The Table of Conſonants.
1 2 3 4 5 6 7
b d j g = = l
p t ch k = =
m n gn ng = =
= dh j g v z
= th sh ch f s lh
n
8 h
9 y
10 r
11 w
12
The Table of Vowels.

The Lord's Prayer in Engliſh.



An Eſſay towards an univerſal Primer; *by Mr.* Fr. Lodwick. *n.* 182. *p.* 134.

II. As the preſent *Alphabets* are imperfect, ſo are alſo the *Primers* or firſt Books, wherein Children and others are taught to *ſpell* and *read*; *Firſt*, in not having a perfect *Alphabet*: *Secondly*, in not being digeſted in ſuch a Method, as is fit and proper to teach them as they ought to be taught. For the uſual Way of teaching to *ſpell*, is to diſmember every *Syllable* (of more than one *Letter*) into many *Syllables*, by expreſſing every Letter apart, and *ſyllabically*, and the *Conſonants* with ſuch a *Vowel* as they are ordinarily named with, and then requiring them to join theſe *Syllables* into one *Word*. But how prepoſterous this Method is, one Inſtance for all will manifeſt: Suppoſe the Monoſyllable *Brand* be to be *ſpelled*, they will teach them thus to diſmember it, *Bee*, *er*, *a*, *en*, *dee*, and then require them to join theſe into one *Syllable*, which it is impoſſible to do, and they muſt be neceſſitated as they have begun, to expreſs this one *Syllable* by five *Syllables*, which was not deſigned; whereas they ſhould teach them to expreſs every *Syllable* intire at firſt Sight, without diſmembring it. And to do this, they muſt proceed gradually; firſt beginning with the moſt *ſimple Syllables*, and ſo by Degrees proceeding to the more difficult and *compounded*, till they can readily pronounce a whole *Syllable* at firſt Sight, even the moſt difficult that are. To that End, let all the *Primers* be thus contrived; at the Top of the Leaf, let all the *Vowels* be placed *ſingly* in Order as they follow in one *Rank*: And under the ſame, place *Syllables*; *firſt*, of *one Vowel* and *one Conſonant* following it, throughout all the Variations; then of *one Conſonant* and *one Vowel* following; *Secondly*, of *two Conſonants* before, and *one Vowel* following, throughout the Variations; *Thirdly*, of *one Vowel* and *three* or *four Conſonants* following; and of *three Conſonants* going before, and *one Vowel* following; *Fourthly*, of *one*, *two* or *three Conſonants* going before a *Vowel*; and *one*, *two*, *three* or *four* Conſonants following; *Fifthly*, ſome *Syllables* with *Diphthongs* or *Triphthongs*; for Inſtance:

a.	*e.*	*i.*	*o.*	*u.*	&c.
ab.	*eb.*	*ib.*	*ob.*	*ub.*	&c.
ad.	*ed.*	*id.*	*od.*	*ud.*	&c.
ba.	*be.*	*bi.*	*bo.*	*bu.*	&c.
ald.	*eld.*	*ild.*	*old.*	*uld.*	&c.
dra.	*dre.*	*dri.*	*dro.*	*dru.*	&c.
balm.	*belm.*	*bilm.*	*bolm.*	*bulm.*	&c.

After this, place a Number of Words of 2, 3, or 4 *Syllables*, from the more eaſy to the moſt difficult Expreſſions, without heed to their Significations. Further, let there follow ſome Words of ſeveral *Syllables*, with the *Accent* variouſly placed, as on the *firſt*, *ſecond*, *third*, &c. Let there be alſo two or three ſmall *Diſcourſes* writ with this *Alphabet*, in ſo many ſeveral

Languages, with the *Accent* rightly placed, and truly diſtinguiſhed by their *Pauſes*.

In *Teaching* with this *Primer*, begin to teach them the true Sound of all the *Vowels* ſingly; then proceed to the following *ſingle Syllables*, beginning with the eaſieſt of Expreſſion, and ſo proceed on gradually to the moſt difficult, and then to the *Words* of more *Syllables*, and laſtly, to the Uſe of the *Accent* and *Pauſes*. When the Learner hath paſt all theſe, you may exerciſe him in the Reading of the *Diſcourſes*, and therein let him exactly obſerve the *Accent* and the *Pauſes*. When they can *read* and *utter* exactly whatſoever is *written* in this *Alphabet* and *Character*, in what Language ſoever, teach them to *write* truly what they hear diſtinctly expreſſed, according to this *Alphabet*, proceeding therein gradually as before, and rightly to place the *Accent* and *Pauſes*, and alſo the Uſe of the *Signs* of the different *Modes* of Speaking.

In *Teaching* alſo obſerve theſe neceſſary *Rules*. 1. Proceed leiſurely and orderly; ſuffer them not to paſs by any *Miſpronunciation* uncorrected, from the Beginning to the End; cauſe them ſo oft to repeat a wrong *Pronunciation*, till with your Aſſiſtance they *pronounce* it truly, allowing for the natural Defects in the Speech of ſome Perſons. The younger will learn theſe *Pronunciations* more eaſily: But the elder may attain them alſo, although with more Difficulty. 2. Suffer them at no hand in *Spelling*, to diſmember any *Syllable* by repeating the *Letters* ſingly, but that they *pronounce* them whole as they find them.

This *New Primer* will without Change, except in the Title, be the ſame for all *Nations* and *Languages*.

Some Obſervations on Languages; *by Mr.* Edw. Lhwyd. *n.* 243. *p.* 280.

III. Mr. *Pezron*'s Notion of the *Greek*, *Roman*, *Celtick Languages*, being of one common Origin, agrees exactly with my Obſervation: But I have not advanced ſo far, as to diſcover the *Celtick* to be the *Mother Tongue*; though perhaps he may not want good Grounds (at leaſt plauſible Arguments) for ſuch an Aſſertion. The *Iriſh* comes in with us, and is a *Dialect* of the *Old Latin*, as the *Britiſh* is of the *Greek*: But the *Gothick* or *Teutonick*, tho' it has alſo much Affinity with us, muſt needs make a Band apart.

Some Obſervations and Conjectures concerning the Chineſe Characters; *by* R. A. *n.* 180. *p.* 69.

IV. Whether there ever were any *Language natural*, I diſpute not: But that there have been, are, and may be *Artificial Languages*, it is not difficult to prove. The *Chineſe Court-Language* is ſaid to be of this Kind, invented and ſpoken by the *Literati* and *Mandarins* throughout the whole Empire of *China*, differing from all the other *Languages* ſpoken in it: And I conjecture it to be nothing elſe but the Names of the *Characters*, by which they write and expreſs their Meaning, arbitrarily impoſed by them, as we in *Europe* ſet Names to *Arithmetical Figures*, not as we pronounce Words written with a *Literal Character*. This I judge by comparing the *Characters* with the Names, Monoſyllables, or Words, they pronounce and read them with. Nor do they aſcend above a Monoſyllabical Name, tho' the *Character* be compoſed of many *ſingle Characters*, each of which hath its proper Senſe and monoſyllabical Name, and though the Meaning of each Character be an Ingredient in the Notion of that compounded Character.

But whatever we may judge of *Language*, it is paſt Diſpute, that *Writeing* was ever *artificial*, how antiently ſoever it were in Uſe; and was the Invention of ſome thinking and ſtudious Men. 'Tis alſo evident that there have been various Ways thought of for expreſſing Significancy, according to the ſeveral *Genii* of the Perſons that were the Inventors: As may be gueſſed by the *Egyptian Hieroglyphicks*, the *Chineſe Characters*, the *Mexican Chronology*, and the *literal Characters* of ſeveral Nations: Each of which ſeem to proceed upon differing Methods and from differing Thoughts of Invention.

Which of theſe Ways is the moſt antient, is hard to prove. The *Ægyptian Mummies* and *Obeliſks* prove a great Antiquity of the *Hieroglyphicks*; but yet the *Chineſe Chronology* (if to be credited) outſtrips the *Ægyptian* in Pretence to Antiquity. For the *Chineſe* make *Fohi* the firſt King of *China* to be the Inventor of their *Character:* And account him to have lived 2950 *Years* before the Time of *Chriſt*; during all which Time they pretend to have a certain and written Account in their Books. But their Account of the Times preceding, they eſteem more hypothetical and fabulous; depending chiefly upon Fiction and oral Tradition: As you will eaſily believe, when you underſtand how many *Years* they make it ſince the *Creation* of the *World* to the preſent *Year* 1686; which by the Account thereof in Mr. *Greaves* his Tranſlation of *Ulug Beig*, will be found to be no leſs than 88640102 *ſolar Years*; there having been run out ſince the *Creation* 8864 *Vén* of Years (every *Ven* containing 10000 ſuch Years), and of the preſent *Ven* this Year 1686 is the 102^d^. Which Account is abundantly more extravagant than the *Ægyptian:* But this need not invalidate their Hiſtory ſince *Fohi*; by which it appears, that their *Character* was invented before the Time of *Moſes*, about 1400 Years, and even before *Menes* the firſt King of *Ægypt*, about 500 Years. So that the *Chineſe* Invention of *Writeing* or *Character*, ſeems to be the moſt antient of that Kind: And the Book *Yekim*, ſaid to be written by *Fohi*, the moſt antient Book.

Theſe Accounts made me the more deſirous to underſtand ſomewhat of the Reality and Truth of what is related concerning the Knowledge of *Literature* and *Manual Arts*, which theſe People of *China* are ſaid to have poſſeſſed ſo long a Time in ſo great Perfection, and without Alteration from the primitive Inſtitution; eſpecially upon the Account of their Art of *Printing*, which gave a Hint to the Inventors of that admirable and moſt uſeful of all Inventions (for the Commonwealth of Learning) the Way of *Printing* here in *Europe*. For *Paulus Jovius* affirms, that the firſt Occaſion of that Invention in *Germany*, was a *German Merchant*, who returning out of *China* into his own Country, related what he had obſerved concerning the Practice of it as uſed in that Country. And tho' the *Chineſe* Way be wholly differing as to the Method of *Compoſing*, from what was invented and perfected here: Yet ſuch an Intimation was enough to an ingenious Artiſt to improve the firſt Contrivance, and make it more accommodate to the *Literal* Way of Writing with us. And as our Way may poſſibly be now brought to the greateſt Perfection for Exactneſs and Expedition, ſo without doubt muſt be their Way of *Printing* any thing juſt as it is written, ſince I find, that they can *Ingrave* their *Stamp* for a Sheet, as ſoon as one of our *Compoſitors* can *Set* and *Correct* a Sheet of our *Literal Character*, and when ſo done, one Man alone will print off 1500 Sheets in one Day. And though it is generally believed to be much the ſame with our *Wooden-Cuts* for *Printing*, yet from ſome Obſervations I have made, I believe it to be much another Way.

By a *Chineſe* Manuſcript, out of which I tranſcribed the Lord's Prayer, in the Year 1666 (when it was loſt), I found that the Pronunciations had no Affinity with the Strokes of the *Character*. Whence I conceived it was either a *numeral Character*, conſiſting of *Numbers*, or elſe a *real Character*, but not a *Literal*, unleſs it were a *literal Character* of ſome other Language than that by which it was pronounced, whoſe Pronunciation is loſt though the Significancy be retained: as if one ſhould read what is written in *Hebrew* בראשית ברא into the *Latin* or *Roman* Language, *in Principio Creavit*, inſtead of *Braſit Bra*, or *Bereſith Bara*, according to the *Maſorethæ*.

Since that time I procured from *China* a *Dictionary* of the *Court-Language* (as I found it written upon by the Perſon that ſent it me from thence). But this whole Book (which I found was *printed*) conſiſted only of the *Chineſe Characters*, without any Interpretation or Pronunciation: However, by the Help of the Pictures of that, and a *Chineſe Almanack*, I quickly found out their *Characters* for *Numbers*, and their Way of *Numeration*, together with the *Figure* and the Uſe of their *Abacus* or Counting-Board, for performing the Operations of *Arithmetick*, which I find pretty near to agree with that of the *antient Romans* (a Deſcription and Picture of which is given by *Urſinus*, *Pignorius*, and *Velſerus*); ſave only that, inſtead of Pins and ſliding Grooves of the *Roman*, the *Chineſe Abacus* hath Springs or Wires, and Beads to ſlide upon them; and that, inſtead of four Pins for *Digits* or *Unites*, the *Chineſe* hath five Beads: So that it may ſeem to argue, that the *Chineſe Abacus* was deſigned for a *Duodecimal Progreſſion*: Whereas that of the *Romans* was deſigned for the *Decimal*. One thing is remarkable in the *Chineſe*, that I find the Places in the *Abacus* to lie horizontal, and the firſt Place to be that next the Left-hand, which I judge was alſo the firſt in their old Way of *Reading*, much the ſame with ours, though their other *Characters* are erected, as I ſhall by-and-by ſhew from the Poſture of *Writing* and *Reading*, which I conjecture they did at firſt make uſe of; and what does yet further agree with this Conjecture, it is remarkable in the newly mentioned Treatiſe of *Ulug Beig*, that whereas the Way of Writing and Reading uſed by the *Arabs*, was from the Right to the Left, the firſt Place or the Place of Units in their *Numeration*, was that next the Right-hand; and ſo came firſt to be read: as did that of *China*, who, as I conceive, read the contrary Way, from the Left to the Right.

It appears therefore, by this Remark, that we received this Way of expreſſing *Numbers* from the *Arabians*, for that we keep the ſame Poſture or Poſition of Places with them, though our Progreſſion in Writing and Reading be the contrary Way. And though we now read them alſo in the Order they are ſet, 21, 22, 36, 48, *&c.* yet we retain alſo the other Way of pronouncing, *viz.* *One and Twenty*, *Two and Twenty*, *Six and Thirty*, *Eight and Forty*, &c.

Now as the *Chineſe* and *Roman Abacus* do much agree, ſave only that they proceed contrary Ways, ſo doth the Way of expreſſing Numbers by Letters or Marks, one Stroke or Line ſignifying *One*, 2 Lines *Two*, 3 Lines *Three*, a Croſs *Ten*, 2 Croſſes *Twenty*, 3 Croſſes *Thirty*, and ſo onwards to a *Hundred*, which they expreſſed by a ſquare Mark, and a Croſs with a Stroke added for a Thouſand, as will appear by the Table annexed. And though the *Characters* are not all the ſame; yet the Order and Method of one agrees very near with that of the other, eſpecially if I may be allowed my Suppoſition, that the primitive Way of Writing and Reading with the *Chineſe* was horizontal, and like the *Greek* and *Latin*, or *European* Way. Now that theſe are properly *Numeral Figures* or *Characters*, it is manifeſt from this, that they have alſo *Word Characters* for every Number, and they can (in the ſame manner as the *Romans* could) expreſs a *Number* by their *Numeral Characters* or *Marks*, and by their *Literal* or *Word Characters*; for as one ſingle Stroke ſignifies *One* or the *Firſt*, ſo does the *Character* (in the Plate marked with E) ſignify the ſame Thing, that is, *One* or the *Firſt*.

Having thus diſcovered their *Characters* for *Numbers*, and their Way of *Numeration*, I was next deſirous to underſtand ſomething concerning their *Language* and *Character*.

Upon peruſing all the Accounts I could meet with in Books, I found very little Satisfaction as to what I inquired after, which was *Firſt*, concerning the Method of their *Character*, whether it conſiſted of a certain Number of Marks, methodically diſpoſed like *Letters* in a *Literal*, or like *Numbers* in a *Numeral*, or like *Radicals* in *Compoſite* or *Decompoſite Derivations?* 'Tis ſaid to be legible in a great many *Languages* conſiderably different one from another; but how this is effected is not related; only it is ſaid, that the Marks are of the Nature of *Arithmetical Figures* (which are become almoſt univerſal, at leaſt to us here in *Europe*). And, *Secondly*, concerning the Number of theſe *Characters*. To which I found as little Satisfaction: For by ſome Relations, I found that there were 120,000, by others 80,000, and by others 60,000. And that a Man muſt be able to remember to write and read at leaſt 8,000, or 10,000, before he will be able to expreſs his Meaning thereby; and that it is the Buſineſs of a Man's whole Life to be thoroughly underſtanding in the *Whole Character*, ſeeming to intimate, that the *Characters* are immethodical, and there are as many *primitive Characters* as Words. Others tell us of various Kinds of *Characters* which have been in Uſe in ſeveral Ages. The *Firſt* they ſay were *hieroglyphical*, like the *Ægyptian* or *Mexican*, conſiſting of Pictures of Animals and Vegetables: But that the *Laſt* are made up of Lines and Points; that they have no ſuch

Thing as *Letters* or *Syllables*, but every diſtinct Word and Notion has a diſtinct *Character*, and that all are *primitive* and *incompoſit*; ſo that if *Calepine*'s Dictionary were to be tranſlated into the *Chineſe*, 'twere neceſſary to have as many diſtinct *radical Characters* as there are Words therein to be found. Which Accounts do ſeem to inſinuate, that this *Character* is the moſt difficult, and the moſt perplexed Piece of Learning in the World, and depends wholly upon the Strength of the Memory, in retaining the Form and Signification of a perplexed Scroul. But whether they who gave us theſe Accounts did do it knowingly, is much to be doubted, my own Obſervations at leaſt, make me think otherwiſe.

I have not yet been able to procure ſufficient Helps to inform myſelf of the whole Art of *Writing* and *Reading* the *Chineſe Character*, and I fear the Relations I have hitherto met with concerning it, were written by ſuch as did not well underſtand it: However, from ſuch Helps as I had, what I collected, or do conjecture, I ſhall here relate. The beſt Help I had, was the Peruſal of ſome Books printed in *China*, with the Pronunciation and Signification of the *Character* in *Latin Letters*. By theſe Books I then obſerved, *Firſt*, that every one of their *Characters*, whether conſiſting of more or fewer Strokes or Marks, were compriſed within a certain ſquare Space, which is proportioned according to the Bigneſs of the Size or Manner of Writing they deſign there to make uſe of; not that the whole Square is filled with every *Character*, but that no Part of that *Character* does exceed the Limits of that Square, ſo that, though the *Character* have but one Stroke, it takes as much Room in the Line as another that hath 20 or 30 ſeveral Marks; ſo that their *Characters* are moſt exactly ranged in Rank and File, not unlike our *Numbers* in *Arithmetick*.

Notwithſtanding which, I find they do vary the Bigneſs of the *Character* upon ſeveral Occaſions, as in the *Titles* of *Books*; in the *Titles* of the *Chapters* or *Sections*; in the *Comments*, *Explications*, or *Notes*; and upon ſeveral other Occaſions of Variety, which they do at Pleaſure with their Pencil, as we uſe Variety of Letters in the *Printing* of a *Book*. The *Titles* of *Books* are generally in very large Characters, 6 or 8 *Times* as big as thoſe of the Book; the *Explication Notes* half of the Bigneſs; the Contents uſually *twice* as big; and the like Variety on ſeveral other Occaſions. I have met with alſo *three* ſeveral Kinds of *Characters*: *Firſt*, The moſt uſual is the fixed or *ſet ſquare* Form. The *ſecond* Sort is the *Running Hand*, in which the Orders of the Courts are written, by their Secretaries, of which I have ſeen three or four Kinds, in which the Pencil is never taken off till the whole *Character* be finiſhed, and ſometimes two or three are all written without Break. The *third* ſeems to be ſomewhat like the *flouriſhing* great Letters uſed by Scriveners at the Beginning of Deeds, and by the *Germans* in the Beginning of Chapters and Sections. They are compounded of the ſame Strokes as the *Set Character*, but modulated and ſhaped a little otherwiſe, to make them appear the more beautiful and regular. A Specimen of each of theſe three are in the *Plate*. This *third* is made uſe of for *Epitaphs* and other *Inſcriptions* on Buildings or Monuments. Theſe 3 Sorts I may call the 3 general Kinds of Writing, but there is to be found an almoſt infinite Variety of Forms, which Men uſe. This will be the more eaſy to be believed, when we conſider, that the *printed Characters* are exactly the ſame with the *written*, inſomuch that every Variety in each Stroke, Line, or Point, that is or can be made with the Pencil, is perfectly expreſſed in the Impreſſion, and the Form, Mode, or Hand, as we call it, of every Writer is exhibited ſo curiouſly, that I think it hardly poſſible to be performed after the Way of *Wooden-Cuts*, as Authors affirm it is, but muſt be done after the Method of our *Copper-Cuts*, printed by a *Rolling-Preſs*, which the Way of expreſſing the *Running* or *Court-Hand* does, I conceive, moſt evidently demonſtrate; and from divers Circumſtances, I could evidently make appear from the Book itſelf, which I cannot ſo well expreſs in Writing. Their *Paper* is generally very thin, and fine, and very tranſparent, but brown; ſo that whatever is written or printed on it, is almoſt as legible on the Back as on the Foreſide, which is of great Uſe in the cutting of their *Stamps*. And thence they never write or print on both Sides of the ſame Leaf, but only on one; and to make the Leaf appear printed on both Sides, they double the Sheet with the printed Sides outwards, and putting the folded Part forward, they ſew, bind, or ſtitch together all theſe Sheets by the cut Edges, and upon whole Sheets inſtead of ſingle Leaves. They begin the Book on the Top of the Right-hand Side of the Page that is next the Right-hand, and they read downwards to the Bottom, then begin the next Line towards the Left-hand at the Top, and ſo read to the Bottom, and ſo proceed to the End of the Book. But this I ſuppoſe not to be the primitive or firſt Way of Writing or Reading. The *Title* of the *Book* is ſet firſt upon the whole Leaf, uſually of a thicker Paper, and ſome *Title* is likewiſe written upon the Folding or Edge of every Sheet, where is ſet alſo the Number of the Book, and the Number of the Sheet, half of which appears on one Side, and half on the other Side of the Fold.

As to the *Character* itſelf, I find (by all the Books and Writings I have yet met with of that Kind) that each of them is made up of a certain Number of Strokes, Lines, or Marks, which are very diſtinct from each other in their Shape and Poſition; and by reaſon that theſe are ſingle Strokes, and, as I conceive, uncompounded, I think they may be called the *Letters*, *Elements*, or *Particles*, out of which the more *compounded Characters* ar conſtructed or contexed. Theſe are the firſt Kind, of which there ar but a very few, and I think thoſe I have deſcribed in the 13th Line of th *Plate* are all.

Two, Three, Four or more of theſe joined together in a certain Order and Contexture (in the doing of which there is a great Regularity an Order obſerved, which is not varied from, and all within the regu *ſquare Space)*, I conceive do make *Syllables* or *primitive radical Characte* each of which have a primitive, ſingle, or diſtinct Notion, or Signific tion, as well as Sound; which is made much uſe of in the more compoun ed Characters, or Words. Of this Kind I take the Figures of the Nu bers to be: If at leaſt they are not ſingle Letters, like the Way of expreſſi

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Numbers in the *Hebrew*, *Greek*, *Arabic*, &c. Languages; for though there may be two or three of the ſingle Strokes joined together into a compound Character, it hinders not but that it may ſtill ſignify a *Letter*, as in the *Greek* Λ. Α. Δ. Ι. Γ. Π. Τ; in the *Runick*, where every Letter hath one upright Line, and ſome other additional Marks: In the *Roman* I. L. F. E. O. Q. V. Y. Or it may ſignify a *Syllable*, as in the *Æthiopick*, and in the *Hanſcrit*, and *Sunſcrit Languages* and *Characters*; the *firſt* of which being the *Brachmans* Character, we find in *P. Kircher*'s *China Illuſtrata*, deſcribed by *P. Roth*, who ſtudied it 7 Years; and the *ſecond* (being a *literal Character* uſed over all *India* by the Merchants), I have ſeen in a Tranſcript brought lately out of *India* by a very worthy Gentleman, who lived there many Years, and had the Curioſity to cauſe to be tranſcribed and tranſlated alſo into *Engliſh*, a Dictionary of their Language, in their own Character.

In which *Characters* or Ways of Writing, a *Vowel* is always joined with a *Conſonant* into one *compound Character*, to make it effable. And then the ſingle Strokes may be taken for ſingle ineffable *Letters*, as are the *Conſonants*, and the Compoſition of two or three (of which one at leaſt may be a *Vowel*) will make *Syllables*.

Of this kind there are not ſo many in the whole *Chineſe Character*, but that it will be eaſy enough to aſſign each a proper *Monoſyllable*, which ſhall have only one or two *Conſonants*, and one or two *Vowels*: That is, the *Conſonants* together and not ſeparate, either both before the *Vowel*, or *Vowels*, if it be a *Dipthong*, or both after it or them.

Of this Kind I underſtand there are about 500, probably 8 x 8 x 8, or 512. I could enumerate a great many, and give you alſo the *Name* or *Words* by which they are pronounced, as alſo their Significations. But (as I ſaid before) Firſt, I conceive the preſent *Chineſe Language* to have no Affinity at all with the *Character*, the true Primitive, or firſt Language, or Pronunciation of it, having been loſt. And Secondly, I want ſome further Help to make a full and complete Diſcovery.

The 3d Sort of *Characters* is a *decompounded* Sort, being made up of two, three, or more of thoſe of the *ſecond* kind, diminiſhed proportionably in their Size, either as to their Length or Breadth, or both, from what they have in the ſame Writing when they are ſingle, and fill up the whole *Letter Square* or *Word's Square*. For there being ſeveral of them to be crouded together within the ſame *Square*, according as they are more in Number, ſo they are always more ſqueezed together. In this *decompound* Sort, there is a regular Order obſerved in the placing of the ſeveral *Characters* of the 2d Sort; there being ſome that are always on the Left-ſide, ſome always on the Right, ſome at the Top, ſome at the Bottom. Of which I doubt not but that they have a certain regular Method, which, had we Dictionaries explained, would be eaſy enough to be diſcovered.

This Method alone of crouding together all the *Characters* (how many ſoever go to make up the *decompounded Character*) into one *Square* (which is of the ſame Size for the moſt *ſimple* and for the moſt *compound*) ſeems to be the great Singularity, by which the *Chineſe Characters* differ from thoſe of all the reſt of the World. And this, I conceive, has been the Reaſon why all People, and poſſibly even the very *Chineſe* themſelves have, and do believe it to be a *real* and not *literal Character:* For if the primitive Language, or Pronunciation of the *Characters*, be loſt (as I conceive it is), and that the Diſpoſition, Order, Method, Texture, or Manner of placing the more *ſimple* in the more *compounded Characters* be alſo loſt, forgotten, or not underſtood, then the whole *Characters* become a *real*, and not a *literal Character*; and an immethodical one to ſuch as want the Method, that muſt be learn'd by Rote, and depend wholly upon the Strength of the Memory to retain it. But I conceive it might be at firſt either a *literal Character*, and ſo the whole *ſquare Character* was compoſed of ſo many diſtinct *Letters*, or *Syllables*, which compoſed the *Word* ſignified thereby; and ſo there might be a regular Order of placing theſe *Letters* in the *Characters*; that is, that the whole *Square* being divided into ſo many Parts, there was a Rule which was the 1ſt, 2d, 3d, and 4th Place: So that there being placed in thoſe the ſeveral *Letters* that made up the *Word*, according to the Order they had in the Word, it was eaſy by that Rule to *decipher* the ſaid *Character*, and thence to find the *Word*, and the Signification, as regularly as if the *Letters* had been written one after another, as moſt other *literal Characters* we know are at this Day written. Or, *ſecondly*, it might be a *real Character* conſiſting of divers Marks or *Letters*, that expreſſed ſo many *ſimple* Notions, ſeveral of which joined together might make up the more *compounded Characters*, of which I have added ſome Examples in the *Plate*, which may be alſo made *literal* and pronounceable, though that Conſideration were not made uſe of when they were firſt invented. What things I have obſerved in my *Chineſe* Books that ſeem to reſpect this Method, I will give more Particulars of, by printing a Specimen of the Book *Ye-kim*; which, explicated by theſe Notions, will, I conceive, appear more intelligible than by the Accounts we find given of it by the *Chineſe* Commentators, and thoſe that have tranſlated them into *Latin*, who ſeem not to have underſtood the true Deſign thereof. For both the *Chineſe* and *European* Commentators aſſert it to be a Conjuring-Book, or a Book to tell Fortunes by, and to be made uſe of by the *Chineſe* for that Purpoſe: Whereas, by the ſmall Specimen I have ſeen of it, I conceive it to contain the whole Ground, Rule, or *Grammar* of their *Character*, Language and Philoſophy; and that by the underſtanding of it, the Foundation and Rule of their Language, and *Character*, may be without much Difficulty *deciphered*, and underſtood.

The preſent Uſe of this *Character* I conceive to be differing from what it was at firſt, both as to the Poſition of *Writing* and *Reading* it; and as to the Expreſſion and *Pronunciation* thereof. For the Way of *Writing* and *Reading* it, I conceive, might at firſt be exactly the ſame with that of the *Greeks*, *Romans*, *Engliſh*, and all other *European* Nations, and alſo the *Æthiopic* and *Coptic:* That is, they began at the Top of the Page towards the Left-hand,

and ſo proceeded towards the Right in the horizontal Line to the End of it, and then began at the left End of the next Line under the firſt, and proceeded with that in the ſame manner, and ſo with the next under that, and all the remaining, continuing to *write* the Words of the Line towards the Right-hand, and the Lines of the Page one under another, till the whoſe Diſcourſes were completed, joining Leaf to Leaf one under another, after the ſame manner as the *Rolls* are at preſent writ, and as the *Volumina* were of the Antients. And to make the Parts of the *Volume* to be the more eaſily come at, without the Trouble of rolling and unrolling, as the antient *Romans* did, and we do with our *Rolls*, they contrived to *fold* them like the Folds of a Fan, forwards and backwards, and ſo ſtitching them together, that the written Sides might lie outwards, and open freely one from another; and that the fair Sides might meet together, it came to make the preſent form of their Books, which being laid, as we generally place our Books before us, they ſeem to begin at the Top of the Page on the Right-hand, and to proceed to the Bottom, and then at the Top of the next Line towards the Left-hand, and deſcend as in the former; proceeding in this Order with all the reſt: Which Way muſt needs be very inconvenient for Writing, however they may uſe the Pencil differing from our Pen. Though there be a Way of Writing from the Top to the Bottom of the Page, which is very convenient for writing the *Syriac*, as alſo for writing *Latin*, *Engliſh*, or *Greek*, where the Writing is to be uſed for *cutting* the *Stamps* of *Wood*, or *graving* of *Copper-Plates* with the ſame *Character* for *Printing*; in which Caſe the *Letters* muſt be written backwards.

Secondly, As to the *Pronunciation* of this *Character*, by the *Court-Language*, or by any other now uſed, I conceive it to be wholly differing from that of a *literal Character*, that is, from being *pronounced* or ſpoken according to the Marks or Figures thereof, whether they be *Simple*, or *Compounded*, and made up of *ſimple Characters* (though there are ſome Inſtances of Affinity in *Characters* and *Words*). The Reaſon of which differing *Pronunciation*, I conceive may have proceeded partly from the Loſs of the Primitive Language, for which it was made; partly from a moſt inconvenient Affectation of *monoſyllabical Words* in this *Court-Language*: To help the Poverty of which, they are fain to make one *Syllable* to ſignify many differing Notions; to do which they have introduced a kind of muſical *Toning* or *Accenting* of each of them, and that not ſingly, but compounded of two or three *Tones* to each Signification of every one of theſe *Monoſyllabies*; partly from the uſing this Way of Writing by divers Nations of differing Languages, who minding only the Figure and Signification, read it in their own Mother-Tongues, as we in *Europe* do *arithmetical Figures*; and partly alſo from the Omiſſion of moſt *grammatical* Diſtinctions, the ſame *Character* ſerving for *Subſtantive* and *Adjective*, *Singular* and *Plural*, in all *Caſes* (ſave only they have ſome Characters for Particles, as *of* and *to* in *Engliſh*), for the *Verb* in all *Tenſes* and *Numbers*, &c. for the *abſtract* and *concrete* Signification, and for divers *metaphorical*, if at leaſt the Interpretation I have met with in the Books I have peruſed be exact;

partly alſo from the *Syntaxis* of them; it being neceſſary to conſider the whole Sentence, to diſcover which Part of Speech each *Character* is of, in that Sentence wherein the Order and the Poſitions of the *Characters* to one another, for which they have Rules, hath its Signification: And, laſtly, from the Loſs of the very Notion of a *literal Character*, whence, for the expreſſing of *proper Names*, they are fain to make uſe of ſeveral *Characters*, whoſe *Sounds* or *Words* come neareſt to the Sound of the *Syllables* of that *Name*, as in the *Plate*, *tam*, *jo*, *vam*; for *Adam*, *Jovan*.

Now, though I conceive this *Character* is not effable properly as a *literal Character*, by any of their preſent Languages; and though poſſibly it might be at firſt a *real Character*, that is, each of them compounded of ſuch Strokes or Marks as by their Figures, Poſitions, and Numbers, in the *Square*, denoted the ſeveral philoſophical Ingredients that made up the Notion of the whole *Character*, as the Book *Ye-Kim* ſeems to ſhew, by giving Rules, as I conceive, for the Order and Significancy of Places in the *Square*, &c. yet I think it not difficult to make it a *literal*, or at leaſt a *ſyllabical Character*, and legible, into a Language ſomewhat after the manner of the *univerſal Character*, invented by the Reverend Biſhop of *Cheſter*, Dr. *Wilkins*. And though this would not be the primitive Language for which it was made, yet for the preſent Uſes of it (the chiefeſt of which is the aſſiſting and refreſhing the Memory, and helping the Imagination by proper Sounds) it might be as good: Wherein the *ſingle Characters* might be *Monoſyllables*, and the *compounded*, *Diſſyllables*, *Triſſyllables*, &c. according to the Number and Order of *ſimple Characters* in the *Square* of the *compounded*. And I am apt to think, that the preſent *Pronunciation* of Languages, as of *Hebrew*, *Syriac*, *Arabic*, *Greek*, and *Latin*, or any other Language that has been ſo long written, may be as much differing from what it was 2000 Years ſince, as an arbitrary one now invented, and grounded on the *Letters*, might poſſibly be. And ſuch an arbitrary *Pronunciation*, if generally agreed upon, might ſerve *as well* for a Help to learn the Signification of *Words*, or *Word-Combination* of *Characters*, as if we now knew the exact primitive *Pronunciations* as critically as the *Maſorethæ* are ſaid to have done that of the *Hebrew*, and poſſibly alſo *much better*; for that by ſuch a one a great many Irregularities and Difficulties of *Pronunciation* (which are to be found in all Languages now ſpoken) might be omitted, and the Whole made exactly regular and eaſy, as might be ſhewn in the *Hebrew*, and *Greek*, and eſpecially in the *Arabic*, whoſe Difficulties are ſufficiently manifeſted by the *Alphabetum Arabicum*, printed at *Rome* 1592. Now as by ſuch a Language the *Character* might be made effable without *muſical Tones*, or difficult *Aſpirations*, ſo had we Dictionaries of the Signification of the *Characters*, we might as ſoon learn the *Chineſe Character* as we can *Latin*, or any other Language to be learned by *Book*, and not by *Speaking*.

Two Perſons deaf *and* dumb, taught *to* ſpeak *and to* underſtand *a* Language; *by Dr.* J. Wallis. *n.* 61. *p.* 1087.

V. 1. About the Beginning of *Jan.* 1661-2, I undertook to teach a Perſon *dumb* and *deof* to *ſpeak* and to *underſtand a Langurge*. The Taſk conſiſts of two very different Parts; each of which doth render the other more difficult: For, beſides that which appears upon the firſt View, to teach a Perſon who *cannot hear* to *pronounce* the *Sound of Words*, there is that other of teaching them to *underſtand a Language*, and know the *Signification* of thoſe *Words*, whether ſpoken or written, whereby he may both expreſs his own Senſe, and underſtand the Thoughts of others. That each of theſe do render the other more hard, is obvious. We find by Experience, that the moſt advantageous Way of teaching a Child his firſt Language, is that of perpetual Diſcourſe; not only what is particularly addreſſed to himſelf, as well in pleaſing Divertiſements or delightful Sportings (and therefore inſinuates itſelf without any irkſome or tedious Labour), as what is directly intended for his more ſerious Information: But that Diſcourſe alſo which paſſeth between others, where without Pains or Study he takes Notice of what *Actions* in the Speaker do accompany ſuch *Words*, and what Effects they do produce in thoſe to whom they are directed; which doth by Degrees inſinuate the Intendments of theſe *Words*: But theſe Helps are wholly obſtructed in our Caſe by *Deafneſs*. And as *Deafneſs* makes it the more difficult to teach him a *Language*, ſo, on the other hand, that Want of *Language* makes it more hard to teach him how to *ſpeak* or *pronounce* the *Sounds*: For there being no other Way to direct his *Speech*, than by teaching him how the *Tongue*, the *Lips*, the *Palate*, and other *Organs of Speech* are to be applied and moved, in the forming of ſuch *Sounds* as are required; to the end that he may, by Art, *pronounce* thoſe *Sounds* which others do by Cuſtom, they know not how, it may be thought hard enough to expreſs in *Writing*, even to one who underſtands it very well, thoſe very nice Curioſities and Delicacies of Motion which muſt be obſerved (though we heed it not) by him, who, without Help of his *Ear* to guide his *Tongue*, ſhall form that Variety of *Sounds* we uſe in *Speaking*; many of which Curioſities are ſo nice and delicate, and the Difference in forming thoſe *Sounds* ſo very ſubtle, that moſt of ourſelves who *pronounce* them every Day, are not able, without a very ſerious Conſideration, to give an Account by what Art or Motion ourſelves form them; much leſs to teach another how it is to be done. And if by *writing* to one who underſtands a *Language* it be thus difficult to give Inſtruction, how, without the Help of *Hearing*, he may utter thoſe *Sounds*, it muſt needs increaſe the Difficulty, when there is no other *Language* to expreſs it in but that of *dumb Signs*.

Theſe Difficulties, however, did not ſo far diſcourage me from that Undertaking, but that I did ſtill conceive it poſſible that both Parts of this Task might be effected. As to the *firſt* of them, though I did not doubt but that the *Ear* doth as much guide the *Tongue* in *Speaking* as the *Eye* doth the *Hand* in *Writing*, or *playing* on the *Lute*; and therefore thoſe who by Accident do wholly loſe their *Hearing*, loſe alſo their *Speech*, and conſequently become *dumb* as well as *deaf* (for it is in a manner the ſame Difficulty for one that *hears* not to *ſpeak* well, as for him that is *blind* to *write* a fair *Hand*). Yet ſince we ſee that it is poſſible for a Lady to attain ſo great Dexterity as in the *Dark* to play on a *Lute*, though to that

Variety of nimble Motions, the *Eye*'s Direction, as well as the Judgment of the *Ear*, might ſeem neceſſary to guide the *Hand*; I did not think it impoſſible, but that the *Organs* of *Speech* might be taught to obſerve their due *Poſture*, though neither the *Eyes* behold their *Motion*, nor the *Ear* diſcern the *Sound* they make. And as to the other, that of *Language* might ſeem yet more poſſible. For, ſince that in Children, every Day, the *Knowledge* of *Words*, with their various Conſtructions and Significations, is by Degrees attained by the *Ear*, ſo that in a few Years they arrive to a competent Ability of expreſſing themſelves in their *firſt Language*, at leaſt as to the more uſual Parts and Notions of it; why ſhould it be thought impoſſible, that the *Eye* (though with ſome Diſadvantage) might as well apply ſuch *Complication* of *Letters* or other *Characters*, to repreſent the various *Conceptions* of the *Mind*, as the *Ear* a like *Complication* of *Sounds?* For tho', as things now are, it be very true, that *Letters* are, with us, the immediate *Characters* of *Sounds*, as thoſe *Sounds* are of *Conceptions*; yet is there no thing in the Nature of the thing itſelf, why *Letters* and *Characters* might not as properly be applied to repreſent immediately, as by the Intervention of *Sounds*, what our *Conceptions* are. Which is ſo great a Truth (though not ſo generally taken notice of), that it is practiſed every Day, not only in the *Chineſe*, whoſe whole *Language* is ſaid to be made up of ſuch *Characters* as do repreſent Things and Notions independent on the *Sounds* of *Words*, and if therefore differently *ſpoken* by thoſe who differ not in the writing of it (like as what, in *Figures*, we write, 1, 2, 3, for *One*, *Two*, *Three*, a *Frenchman*, for Example, reads *Un*, *Deux*, *Trois*), but, in part, also among ourſelves, as in the *Numeral Figures* now mentioned, and many other *Characters* of Weights and Metals uſed indifferently by divers Nations to ſignify the ſame *Conceptions*, though expreſſed by a different *Sound* of *Words*; and more frequently in the Practice of *Specious Arithmetick*, and Operations of *Algebra*, expreſſed in ſuch Symbols, as ſo little need the Intervention of *Words* to make known their Meaning, that when different Perſons come to expreſs, in *Words*, the *Senſe* of thoſe *Characters*, they will little agree upon the ſame *Words*, though all expreſs the ſame *Senſe*, as the Tranſlators of one and the ſame Book into another Language.

And though I will not diſpute the practical Poſſibility of introducing a *univerſal Character*, in which all Nations, though of different *Speech*, may expreſs their common *Conceptions*; yet, that ſome two or three (or more) Perſons may, by Conſent, agree upon ſuch *Characters*, whereby to expreſs each to other their *Senſe* in *Writing*, without attending the *Sound* of *Words*, is ſo far from an Impoſſibility, that it muſt needs be allowed to be very feaſible, if not facile. And if it may be done by new-invented Characters, why not as well by thoſe already in Uſe? Which though to thoſe that know their common Uſe, they may ſignify *Sounds*; yet, to thoſe that know it not, or do not attend it, may be as immediately apply'd to ſignify *Things* or *Notions*, as if they ſignified nothing elſe: And conſequently, ſo long as it is purely arbitrary, by what *Character* to expreſs ſuch a *Thing* or *Notion*, we may as well make uſe of that *Character* or *Collection* of *Letters* to expreſs

Thing to the *Eyes* of him that is *deaf*, by which others expreſs the und or Name of it to thoſe that *hear*. So that, indeed, that ſhall be to a *real Character*, which expreſſeth to another a *vocal Sound*, but ſigni- to both the ſame *Conception*, which is, to *underſtand the Language*.

Theſe were the fundamental Grounds of Poſſibility in Nature; to which dded the following Conſiderations, which made me think it morally poſ- e, that is, not impoſſible to ſucceed in Practice. I conſidered from how and deſpicable Principles the whole Body of *Geometry*, by continual nſequence, is inforced; and if ſo fair a Pile and curious Structure may raiſed, and ſtand faſt upon ſo ſmall a Bottom, I could not think it in- dible, that we might attain ſome conſiderable Succeſs in this Deſign, w little ſoever we had at firſt to begin upon, and, from thoſe little *Actions* d *Geſtures*, which have a kind of natural Significancy, we might, if well anaged, proceed gradually to the Explication of a *complete Language*, d withal, direct to thoſe Curioſities of *Motion* and *Poſture* in the *Organs* *Speech*, requiſite to the *Formation* of a *Sound* deſired, and ſo to effect th Parts of what we intend. I was further encouraged by the Conſidera- on of the Perſon, who was very ingenious and apprehenſive, and ſo far, t leaſt, a *Mathematician*, as to draw Pictures, whereby he was already accuſtomed to obſerve and imitate thoſe little Niceties in a Face, without which it is not poſſible to draw a Picture well. I ſhall add this alſo, that once he could have *ſpoken*, though ſo long ago, that, I think, he doth ſcarce remember it. But having, by Accident, when about five Years of Age, loſt his *Hearing*, he conſequently loſt his *Speech* alſo; not all at once, but by Degrees, in about half a Year's Time; which, though it do confirm what I was ſaying but now, how needful it is for the *Ear* to guide the *Tongue* in *Speaking* (ſince that Habit of *Speaking*, which was attained by *Hearing*, was alſo loſt with it) and might therefore diſcourage the Undertaking; yet I was thereby very much ſecured, that his Want of *Speech* was but a Conſequent of his Want of *Hearing*, and did not proceed originally from an Indiſpoſition in the *Organs* of *Speech* to form thoſe *Sounds*.

But though I did believe it poſſible for him to *learn* ſo to *ſpeak* as to be underſtood; yet I could not promiſe myſelf, that he ſhould *ſpeak* ſo accurately, but that a critical Ear might eaſily diſcern ſome Failures or little Differences from the ordinary *Tone* or *Pronunciation* of other Men; becauſe the Neglect of it it in his younger Years, when the *Organs* of *Speech*, being yet tender, were more pliable, might now render them leſs capable of that Accurateneſs which thoſe of Children attain unto, whereof we have daily Experience; it being found very difficult, if not impoſſible, to teach a Foreigner, well in Years, the accurate *Pronouncing* of that *Sound* or *Language*, which in his tender Years he had not learned. Beſides, the *Ear* being ſo neceſſary to guide and correct the *Tongue*, it is not reaſonably to be expected, that he who cannot *hear*, though he may know how to *ſpeak* truly, ſhould yet perform it ſo accurately, as if he had the Advantage of his *Ear* alſo.

Nor could I promiſe, nor indeed hope, that how accurately ſoever he might learn to *ſpeak*, he ſhould be able to make ſo great a Uſe of it as others do: For ſince that he cannot *hear* what others ſay to him, as well as expreſs his own Thoughts to them, he cannot make ſuch Uſe of it in Diſcourſe as others may. And though it may be thought poſſible, that he may in Time diſcern, by the *Motion* of the *Lips* viſible to the *Eye*, what is ſaid to him, yet this cannot be expected till at leaſt he be ſo perfectly Maſter of the *Language*, as that by a *few Letters* known, he may be able to ſupply the reſt of the *Word*, and by a few *Words*, the reſt of the *Sentence*, or at leaſt the Senſe of it, by a probable Conjecture (as when we *decipher* Letters written in *Cipher)*. For, that the Eye can actually diſcern all the Varieties of *Motion* in the *Organs* of *Speech*, and ſee what *Sounds* are made by thoſe *Motions* (of which many are inward, and are not expoſed to the *Eye* at all) is not imaginable. But as to the other Part of our Deſign, I ſee no Reaſon at all to doubt, but that he might attain a *Language*, and the *Elegancy* of it as perfectly as thoſe that *hear*.

The Way I have taken towards this Deſign, is in general ſufficiently intimated already: As to that of *Speech*, I muſt firſt, by the moſt ſignificant *Signs* I can, make him to underſtand in what *Poſture* and *Motion* I would have him apply his *Tongue*, *Lips*, and other *Organs* of *Speech*, to the forming of ſuch a *Sound* as I direct; which, if he hit right, I confirm him in it; if he miſs, I ſignify to him in what he differed from my Direction, and to what Circumſtances he muſt attend to mend it. And for this Work I was ſo far prepared before-hand, that I had heretofore, upon another Occaſion, (in my Treatiſe *de Loquela*, prefixed to my *Grammar for the Engliſh Tongue*) conſidered very exactly (what few attended to) the accurate Formation of all *Sounds* in *Speaking* (at leaſt as to our own Language, and thoſe I knew) without which it were in vain to ſet upon this Task. As to that of teaching him the *Language*, I begin with that little Stock of ſuch *Actions* and *Geſtures* as have a kind of natural Significancy; and from them, or ſome few *Signs* which himſelf had before taken up, to expreſs his Thoughts as well as he could, proceed to teach him what I mean by ſomewhat elſe; and ſo, by Steps, to more and more: And this, ſo far as I well can, in ſuch Method as that what he knows already may be a Step to what he next is to learn.

He hath been already with me ſomewhat more than two *Months*, and th Succeſs is more than I did expect. There is hardly any *Word* which (wit Deliberation) he cannot *ſpeak*; and he hath already learned a conſiderabl Part of *Engliſh Words* of moſt frequent Uſe: So that I may ſay the greate Difficulty of both Parts of the Undertaking is almoſt over; what remai is little more than the Work of Time and Exerciſe.

A further Account by— ibid. p. 1098. The Perſon to whom the foregoing Diſcourſe doth refer, is Mr. *Dani* *Whaley*, Son of Mr. *Whaley*, late of *Northampton*, and Mayor of th Town. He was preſent at the Meeting of the *Royal Society*, *May* 21 1662, and did there, to their great Satisfaction, *pronounce* diſtinctly enoug ſuch *Words* as by the Company were propoſed to him; and though not a togeth ogether with the uſual *Tone* or *Accent*, yet ſo as eaſily to be underſtood. About the ſame Time alſo (his *Majeſty* having heard of it, and being willing to ſee him) he did the like ſeveral Times at *Whitehall*, in the Preſence of his *Majeſty*, his Highneſs *Prince Rupert*, and divers others of the Nobility. In the Space of a *Year*, which was the whole Time of his Stay with Dr. *Wallis*, he had *read* over a great Part of the *Engliſh Bible*, and had attained ſo much Skill as to *expreſs* himſelf intelligibly in ordinary Affairs; to *underſtand Letters* written to him, and to write Anſwers to them, though not elegantly, yet ſo as to be *underſtood:* And, in the Preſence of many Foreigners (who out of Curioſity have come to ſee him), hath oftentimes not only *read Engliſh* and *Latin* to them, but *pronounced* the moſt difficult *Words* of their Languages (even *Poliſh* itſelf) which they could propoſe to him.

The ſaid Doctor hath ſince done the like for Mr. *Alexander Popham* (a young Gentleman of a very good Family, and a fair Eſtate), who did from his *Birth* want his *Hearing*.

A Method of inſtructing *Perſons* deaf *and* dumb *to* ſpea *and* underſtand *a* Language; *by Dr.* J. Wallis. *n.* 245. *p.* 353.

VI. In order to teach a *Language* to a *deaf* Perſon, it is neceſſary, in the *firſt* Place, that he be taught to *write*, that there may be ſomewhat to expreſs to the Eye what the *Sound* (of *Letters*) repreſents to the Ear.

It will *next* be very convenient (becauſe Pen and Ink is not always at Hand) that he be taught how to *deſign* each *Letter*, by ſome certain Place, Poſition, or Motion of a Finger, Hand, or other Part of the Body (which may ſerve inſtead of *Writing*): As for Inſtance, the 5 Vowels, *a*, *e*, *i*, *o*, *u*, by pointing to the Top of the 5 Fingers: And the other Letters, *b*, *c*, *d*, &c. by ſuch other Place or Poſture of a Finger as ſhall be agreed upon.

After this, a *Language* is to be taught the *deaf* Perſon, by like Methods as Children are at firſt taught a *Language* (though the thing perhaps be not heeded); only with this Difference: Children learn *Sounds* by the *Ear*, but the *deaf* Perſon is to learn *Marks* (of thoſe *Sounds*) by the *Eye*. But both the one and the other do equally ſignify the ſame Thing or Notions, and are equally *(Significantia ad Placitum)* of mere *arbitrary* Signification.

It is then moſt natural (as Children learn the *Names* of Things) to furniſh him (by Degrees) with a *Nomenclator*; containing a competent Number of *Names* of Things common and obvious to the *Eye* (that you may ſhew the Thing anſwering to ſuch a *Name*). And theſe digeſted under convenient *Titles*, and placed under them in ſuch convenient Order (in ſeveral Columns, or other orderly Situation in the Paper) as by their Poſition beſt to expreſs to the *Eye* their *Relation* or Reſpect to one another. As, *Contraries*, or *Correlatives*, one over-againſt the other; *Subordinates*, or *Appurtenances*, under their Principals; which may ſerve as a kind of *local Memory*. Thus in *one* Paper, under the Title *Mankind*, may be placed (not confuſedly, but in decent Order) *Man*, *Woman*, *Child*, &c. and if you pleaſe, the *Names* of ſome known Perſons; with Spaces left to be ſupplied with other like *Names* or *Words*, as after there may be Occaſion. Then (in *another* Paper) under the Title *Body*, may be written (in like convenient Order)

der) the *Parts* of the *Body*, as *Head*, (*Hair*, *Skin*, *Ear*), *Face*, *Neck*, *Breaſt*, *Belly*, &c. with like Spaces, as before, for more to be added, as there is Occaſion. And when he hath learned the Import of *Words* in each Paper, let him *write* them in like manner in diſtinct Leaves or Pages of a Book (prepared for that Purpoſe) to confirm his *Memory*, and to have Recourſe to it upon Occaſion. In a *third* Paper you may give him the inward Parts, as *Skull*, *Throat*, *Stomach*, *Heart*, *Lungs*, &c. In *another* Paper, under the Title *Beaſt*, may be placed the ſeveral *Kinds* of *Beaſts*, as *Horſe*, *Cow*, *Sheep*, *Hog*, *Dog*, *Hare*, &c. Under the Title *Bird* or *Fowl*, the ſeveral *Kinds* of *Birds*; as *Hen*, *Duck*, *Gooſe*, *Kite*, *Lark*, &c. Under the Title *Fiſh*, put *Pike*, *Eel*, *Plaice*, *Salmon*, *Lobſter*, &c. You may then put *Plants* or *Vegetables*, under ſeveral Heads, or Subdiviſions of the ſame *Head*, as *Trees*, *Fruits*, *Flowers*, *Herbs*, *Corn*, &c. And the like of *Inanimates*, as *Heaven*, *Sun*, *Moon*, *Stars*, *Elements*; *Earth*, *Metals*, *Minerals*, *Waters*, *Air*, *Meteors*, *Fire*, &c. Under the Title *Cloaths*, put the ſeveral Sorts, both *Woollen*, *Linnen*, &c. And under the Title, *Houſe*, *Room*, &c. the *Parts*, *Furniture*, and *Utenſils* belonging thereunto, with Diviſions and Subdiviſions, as there is Occaſion. And in like manner from Time to Time may be added more Collections or Claſſes of *Names* or *Words*, conveniently digeſted under diſtinct Heads, and ſuitable Diſtributions, to be written in diſtinct Leaves or Pages of his Book, in ſuch Order as may ſeem moſt convenient.

When he is furniſhed with a competent Number of *Names*, it will be ſeaſonable to teach him (under the Titles *Singular*, *Plural*) the Formation of *Plurals* from *Singulars*, by adding *s* or *es*, *Hand*, *Hands*, *Face*, *Faces*; *Fiſh*, *Fiſhes*, &c. with ſome few *Irregulars*, as *Man*, *Men*; *Woman*, *Women*; *Foot*, *Feet*; *Mouſe*, *Mice*; *Ox*, *Oxen*, &c. which (except the *Irregulars*) will ſerve for *Poſſeſſives* (to be after taught him) which are formed from their *Primitives*, by like Addition of *s*, or *es*, except ſome few *Irregulars*; as *my*, *mine*; *thy*, *thine*; *our*, *ours*, &c. And in all thoſe, and other like Caſes, it will be proper firſt to ſhew him the *Particulars*, and then the *general Title*.

Then teach him in another Page or Paper the *Particles*, as *a*, *the*, *theſe*, &c. And the *Pronouns*, as *I*, *Thou*, *He*, *They*, *Who*, &c, Then, under *Adjective*, *Subſtantive*, teach him to connect theſe, as *my Hand*, *your Head*, *their Shoes*, &c. To furniſh him with more *Adjectives*, under the Title *Colours*, you may place *Black*, *White*, *Grey*, &c. and having ſhewed the Particulars, let him know, theſe are called *Colours*. The like for *Taſte*, *Smell*, *Hearing*, and *Touch* or *Feeling*. From whence you may furniſh him with Examples of *Adjectives* with *Subſtantives*, as *White Bread*, *Soft Cheeſe*, *My Black Hat*, &c. And then inverting the Order, *Subſtantive* and *Adjective* (with the *Verb Copulative* between) as *Silver is White*, *Gold is Yellow*, *Lead is Heavy*, *I am not well*, &c. which will begin to give him ſome Notion of *Syntax*. In like manner, when *Subſtantive* and *Subſtantive* are ſo connected: As *Gold is a Metal*; a *Roſe is a Flower*; *Larks are Birds*, &c. Then as thoſe before relate to *Quality*, you may give him ſome other Words relating to *Quantity*; as *Long*, *Short*, *Broad*, *Many*, *Full*, &c. Then

Words of *Figure*; as *Strait*, *Round*, *Concave*, *Convex*, &c. Of *Geſture*, as *Stand*, *Sit*, &c. Of *Motion*; as *Move*, *Run*, *Fly*, *Creep*, &c. Then Words relating to *Time*, *Place*, *Number*, *Weight*, *Meaſure*, *Money*, &c. are (in convenient Time) to be ſhewed him diſtinctly; as likewiſe the Names and Situations of *Places* and *Countries*, which are convenient for him to know; which may be orderly written in his Book, and ſhewed him in *Maps*, &c.

After the *Concord* of *Subſtantive* and *Adjective*, he is to be ſhewed (by convenient Examples) that of the *Nominative* and *Verb*; as for Inſtance, *I go*, *He ſits*, *the Fire burns*; with the Titles on the Top, *Nominative*, *Verb*. After this, under the Titles *Nominative*, *Verb*, *Accuſatives*, give him Examples of *Verbs Tranſitives*; as, *You ſee me*; *the Fire burns the Wood*: Or even with a *Double Accuſative*; as *You teach me (Writing, or) to write*. After this you may teach him the *Flexion* or *Conjugation* of a *Verb*, or what is equivalent thereunto. For in our *Engliſh Tongue*, each *Verb* hath but *Two Tenſes*, the *Preſent* and the *Preter*, and *Two Participles*, the *Active* and the *Paſſive*; all the reſt is performed by *Auxiliaries*. Which (*Auxiliaries* have no more *Tenſes* than the other *Verbs*. Thoſe *Auxiliaries* are, *Do*, *Did*; *Will*, *Would*; *Shall*, *Should*; *May*, *Might*; *Can*, *Could*; *Muſt*, *Ought to*; *Have*, *Had*; *Am* (*Be*) *Was*: And if by Examples you can inſinuate the Signification of theſe few Words, you will have taught him the whole *Flexion* of the *Verb*. And here it will be convenient (once for all) to write him out a full *Paradigm* of ſome one *Verb* (ſuppoſe to *ſee*) through all thoſe *Auxiliaries*. The *Verb* itſelf hath but theſe 4 Words to be learned; *See*, *Saw*; *Seeing*, *Seen*; ſave that, after *thou* in the *ſecond Perſon ſingular* (in both *Tenſes*) we add *eſt*; and in the *third Perſon ſingular* (in the *Preſent Tenſe*) *eth* or *es*; or inſtead thereof, *ſt*, *th*, *s*; and ſo in all *Verbs*. Then, to the *Auxiliaries*, *Do*, *Did*; *Will*, *Would*; *Shall*, *Should*; *May*, *Might*; *Can*, *Could*: *Muſt*, *Ought to*, we adjoin the Indefinite *See*; and, after *Have*, *Had*, *Am* (*Be*) *Was*, the Paſſive Participle *Seen*; and ſo for all other *Verbs*.

But the *Auxiliary*, *Am* or *Be*, is ſomewhat *irregular*; in a double Form; *Am*, *Art*, *Is*; Plural, *Are*, *Was*; *Waſt*, *Was*; Plural *were*.

Be, *Beeſt*, *be*; Plural *Be*. *Were*, *Wert*, *Were*, Plural *Were*.

Be (*Am*) *Was*; *Being*, *Been*.

Which (attended with the other *Auxiliaries*) make up the whole *Paſſive Voice*.

All *Verbs* (without Exception) in the *Active Participle*, are formed by adding *ing*; as, *See*, *Seeing*; *Teach*, *Teaching*, &c. The *Preter Tenſe* and the *Paſſive Participle* are formed (regularly) by adding *ed*; but are oft ſubject to *Contractions*, and other *Irregularities* (ſometimes the ſame in both; ſometimes different). And therefore it is convenient here, to give a Table of *Verbs* (eſpecially the moſt uſual) for thoſe *three* Caſes (which may at once teach their Signification, and their Formation) as, *Boil*, *Boiled*, *Boiled*; *Bake*, *Baked*, *Baked*, &c. *Teach*, *Taught*, *Taught*; *Buy*, *Bought*, *Bought*, &c. *Give*, *Gave*, *Given*; *Write*, *Wrote*, *Written*, &c.

The *Verbs* being thus diſpatched, he is then to learn the *Prepoſitions*; wherein lies the whole *Regimen* of the *Noun* (For, Diverſity of *Caſes* we have none). The Force of which is to be inſinuated by convenient Examples, ſuited to their different Significations; as, for Inſtance, *Of*; *A Piece* of *Bread*; *A Cup* of *Water*; *A Pint* of *Wine*, &c. And in like manner, for *Off*, *On*, *To*, *From*, *At*, *In*, *By*, &c. And by this Time he will be pretty well enabled to underſtand a ſingle Sentence.

In the laſt Place, he is (in like manner) to be taught *Conjunctions* (which ſerve to connect, not *Words* only, but *Sentences*); as, *And*, *if*, *But*, *Becauſe*, *Therefore*, &c. and theſe illuſtrated by convenient Examples; as, *Becauſe* I am cold, *Therefore* I go to the Fire, *That* I may be warm; *For* it is cold Weather.

By this Time his Book (if well furniſhed with Plenty of Words, and thoſe well digeſted, under ſeveral Heads, and in good Order; and well recruited from Time to Time, as new Words occur) will ſerve him in the Nature of a *Dictionary* and a *Grammar*. And in caſe the *deaf* Perſon be otherwiſe of a good natural Capacity, and the Teacher of good Sagacity, by this Method (proceeding gradually, Step by Step) you may (with Diligence and due Application of Teacher and Learner) in a *Year*'s Time, or thereabouts, perceive a greater Progreſs than you would expect; and a good Foundation laid for further Inſtruction, in Matters of *Religion*, and other *Knowledge*, which may be taught by Books.

It will be convenient, all along, to have Pen, Ink, and Paper at hand, to write down in *Words* what you ſignify to him by *Signs*, and cauſe him to write (or ſhew him how to write) what he ſignifies by *Signs*: Which way (of ſignifying their Minds by *Signs*) *deaf* Perſons are often very good at. And we muſt endeavour to learn their Language (if I may ſo call it) in order to teach them ours, by ſhewing what *Words* anſwer to their *Signs*. It will be alſo convenient, as you go along (after ſome convenient Progreſs made), to expreſs, in as plain Language as may be, the Import of ſome of the Tables. As for Inſtance, The *Head is the higheſt Part* of the *Body*; the *Feet* the *loweſt Part*; the *Forehead* is *over* the *Eyes*, &c. And ſuch plain Diſcourſe, put into *Writing*, and particularly explained, will teach him, by Degrees, to underſtand plain Sentences. And like Advantages a ſagacious Teacher may take, as Occaſion offers itſelf from Time to Time.

This is the *Method* I uſed, with good Succeſs, about 34 Years ago, when I taught Mr. *Alexander Popham*, who was born *deaf*, to *ſpeak* diſtinctly, and to *underſtand a Language*, ſo as to expreſs his Mind (tolerably well) by *writing*, and to *underſtand* what was *written* to him by others, as I had before taught Mr. *Daniel Whaley*.

VII. *A Paper of leſs general Uſe* omitted ; *viz.*

A *Catalogue* of ſome *Indian* and *Chineſe Manuſcripts*, which were ſent to Dr. *Arthur Charlett* and the late Dr. *Edw. Bernard*, by Mr. *George Lewis*, from *Fort St. George*, in 1698. *Theſe curious Manuſcripts being ſhewn to the* Royal Society *by the Favour of Dr.* Charlett, *it appeared, by a* Sample *or* Specimen *of the Leaves and Fruit of the* Ampana *Hort. Mal. Tom.* I. *p.* 13. *Fig.* 10. *or* Palma Malabrica, Floſculis Stellatis, Fructu Longo Squamato *D. Syen. ib. or* Palma Coccifera Folio Plicatili Flabelliformi major. Ampana *H. M. Raii Hiſt. p.* 1366, *brought to the* Society *by Mr.* James Petiver, *that the ſeveral* Leaves *of all theſe* Books *were made of the* Leaves *of the* Palm *wrought on by a* Stile. *n.*246.*p.*421.

VIII. *Accounts of the Books* omitted.

1. *Petri Lambecii* Lib. Primus Prodromi *Hiſtoriæ Literariæ.* *n.* 30. *p.* 575.
2. A Diſcourſe touching the *Original* of *Human Literature*, both *Philology* and *Philoſophy*; in two Parts; by *Theop. Gale*, M. A. *Ox.* 1669, and 1671, in 4*to*. *n.*74.*p.*2231.
3. Reflections upon *Antient* and *Modern Learning*; by *W. Wotton*, B. D. *Lond.* 1694, in 4*to*. *n.* 214.*p.*264.
4. *Librorum Manuſcriptorum* Academiarum *Oxonienſis* & *Cantabrigienſis*, & Celebrium per *Angliam Hiberniamque* Bibliothecarum Catalogus; cum Indice Alphabetico. Cura *Edw. Bernardi.* Tomis Duobus *in Fol. The Account of this Book is here inlarged, and ſeveral Inſtances given of the great* Uſefulneſs *of ſuch* Catalogues. *n.* 211.*p.*260. *n.* 247.*p.*442.
5. Syſtema *Bibliothecæ* Collegii *Pariſienſis Soc. Jeſu.* A *Paris*, 1678, in 4*to*. *n.*140.*p.*1012
6. *Julii Pflugk* Equitis *Saxonici* Epiſtola ad perilluſtrem *atque* Generoſiſſimum Virum *Ludovicum à Seckendorff*, Virum de utraque Republica Meritiſſimum, præter fata *Bibliothecæ Budenſis*, *Librorum* quoque in ultima Expugnatione repertorum *Catalogum* exhibens. *Jan.* 1688, in 8*vo*. *n.*243.*p.*305.
7. Of *Education*, eſpecially of *young Gentlemen:* In two Parts; the 2*d Impreſſion* with *Additions*. *Oxon.* in 8*vo*. *n.*123.*p.*572.
8. *Alphabetum Naturæ*, Auth. F. M. *B. V. Helmont.* 1667. *n.* 31. *p.* 602.
9. Diſcours Phyſique de la *Parole*, par M. *De Cordemoy*; à *Paris*, in 12*mo*, *tranſlated into* Engliſh. *Lond.* 1668, in 12*mo*. *n.* 37. *p.* 736.
10. Elements of *Speech:* An Eſſay of Inquiry into the natural Production of *Letters*; together with an Appendix to *inſtruct* Perſons *deaf* and *dumb:* By *Will. Holder*, D. D. *Lond.* 1669, in 8*vo*. *n.* 39. *p.* 788. *n.* 47. *p.* 958.
11. An Eſſay towards a *real Character*, and a *philoſophical Language*; by *Jo. Wilkins*, D. D. *n.* 35. *p.* 690.
12. A *Grammar* of the *Engliſh Tongue*, in *Fol.* by Dr. *Jo. Wallis.* To which is prefixed a Treatiſe *De Loquela*, by the ſame Author, 1652. *n.*61.*p.*2099.

n. 23. *p.* 4054. 13. A ſhort Eſſay, directing how to divide a *Period* into *Sentences*; with what *Points* the *Sentences* ſhall be *diſtinguiſhed*, &c. by Mr. *Lewis*.

n. 110. *p.* 235. 14. An Eſſay to facilitate the *Education* of *Youth*, by bringing down the Rudiments of *Grammar* to the Senſe of *Seeing*; which ought to be improved by *Syncriſis*, fitted to Childrens Capacities, for the Learning eſpecially of the *Engliſh*, *Latin* and *Greek Tongues*: In 3 Parts; an *Accidence*, a *middle Grammar*, and a *critical* or *idiomatical Grammar*. By Mr. *Lewis* of *Tottenham*. *Lond.* in 8*vo*.

n. 48. *p.* 975. 15. An Examen of the Way of *Teaching* the *Latin Tongue* by *Uſe* alone. *Engliſhed* out of *French*. *Lond.* 1669, in 12*mo*.

n. 48. *p.* 973. 16. An hiſtorical Eſſay, endeavouring a Probability that the *Language* of *China* is the *primitive Language*; by *Jo. Webb*, Eſq; *Lond.* 1669, in 8*vo*

n. 140. *p.* 1013 17. *Gloſſarium* ad Scriptores *Mediæ* & *Infimæ Latinitatis*; in quo *Latina Vocabula Notatæ* Significationis explicantur: complures *Ævi Medii Ritus* & *Mores*; *Legum*, *Conſuetudinum Municipalium*, & *Juris-Prudentiæ* Recentioris *Formulæ* & *Obſoletæ* Voces; utriuſque Ordinis *Eccleſiaſtici* & *Laici Dignitates* & *Officia*, *&c.* Enucleantur, & Illuſtrantur: Innumera denique Scriptorum Loca, *Græcorum*, *Gall. Lat. Ital. Hiſpan. German. Anglo-Sax.* Expenduntur, Emendantur, Elucidantur. Auth. *Carolo du Freſne*. A *Paris*, 1678, in *Fol.* 3 *Vol.*

n. 126. *p.* 642. 18. De l'*Art de Parler*; à *Paris*, 1675, in 12*mo*.

n. 93. *p.* 6014. 19. De *Poematum Cantu* & Viribus *Rhythmi*. *Oxon.* 1673, in 8*vo*.

n. 227. *p.* 522. 20. Λυκοφρόνος τοῦ Χαλκιδέως Αλεξάνδρα. *Lycophronis Chalcidenſis Alexandra*; cum *Græcis Iſacii Tzetzis* Commentariis. Accedunt Verſiones, Variantes Lectiones, Emendationes, Annotationes, & Indices neceſſarii. Cura & Opera *Joh. Potteri.* A. M. *Oxon.* 1697.

n. 54. *p.* 1093. 21. *Athanaſii Kircheri* Ars Magna *Sciendi* ſive *Combinatoria*. *Amſtel.* 1669, in *Fol.*

n. 106. *p.* 139. 22. *Logica*, ſive *Ars Cogitandi*; è Tertia apud *Gallos* Editione Recognita & Aucta, in *Latinum* Verſa. *Lond.* 1674, in 8*vo*.

CHAP. II.

Chronology, Hiſtory, Antiquities.

To find the Year of the Julian Period; *by R. P.* De Billy. *n.* 18. *p.* 324.

I. 1. MUltiply the *Solar Cycle* by 4845, and the *Lunar* by 4200, and that of the *Indiction* by 6916; then divide the Sum of the Products by 7980, which is the *Julian Period*: The Remainder of the Diviſion, without having Regard to the Quotient, ſhall be the *Year* of the *Julian Period* required. *e. g.* Let the *Cycle* of the *Sun* be 3; of the *Moon* 4; and of the *Indiction* 5. Multiply 3 by 4845, and you have 14535; and 4 by 4200, comes 16800; and 5 by 6916, comes 34580. The Sum of the Products is 6591 ; which, being divided by 7980, gives 8 for the Quotient, and the Number 2075, which Remains is the *Year* of the *Julian Period*.

2. The *Julian Period* is a Baſis, whereon to found *Chronology* not liable to Controverſy, as the *Age* of the *World* is: And it is the Number aboveſaid, to wit, 7980, which is the Product of 28 (the *Solar Cycle*) × 19 (the *Lunar Cycle*) × 15 (the *Indiction*). This *Period* (firſt invented by *Robert Lothoring*, Biſhop of *Hereford*, and 500 Years after fitted for *Chronological* Uſes by *Joſeph Scaliger*) is ſuch a Limit to *Chronology*, that within the Space of 7980 Years, the Number of the *Sun's Cycle*, the *Prime* and the Year of the *Roman Indiction* (which relates to their antient Laws and Records) can never happen alike. And theſe Remarks being given, the Year of the *Julian Period* is by the former Rule infallibly found.

Demonſtrated by Mr. J. Collins. *n.* 30. *p.* 364.

The Problem itſelf may be thus propoſed; *Any Number of* Diviſors, *together with their* Remainders *after* Diviſion, *being propoſed, to find the* Dividend.

This Problem thus generally propoſed was reſolved long ſince by *John Geſius*, by the Help of particular fixed Multipliers: And to clear up what Authors have omitted concerning them, we ſay that each of theſe *Multipliers* is relative to the *Diviſor* to which it belongs, and thus define it; *It is ſuch a Number, as* divided *by the reſt of the* Diviſors, *or their* Product, *the* Remainder *is* 0; *but* divided *by its own* Diviſor, *the* Remainder *is an* Unit.

We require the *Diviſors* propoſed to be *primitive* to each other, *i. e.* that no Two or more of them can be reduced to leſſer Terms by any *common Diviſor*: For if ſo, the Queſtion may be poſſible in itſelf, but not reſolvable by Help of ſuch *Multipliers*, ſuch being impoſſible to be found. The Reaſon is, becauſe the *Product* of an odd and even Number is always even, and that divided by an even Number, leaves either nothing, or an even Number.

Diviſors.	28	The *Multipliers* relative thereto are	3845.
	19		4200.
	15		6916.

The *Definition* affords Light enough for the Diſcovery of theſe Numbers. To inſtance in the *firſt*; the *Product* of 19 and 15 is 285, which *multiply* by all Numbers ſucceſſively, and *divide* by 28, till you find the *Remainder* required. Thus *twice* 285 is 570, which *divided* by 28, the *Remainder* is 10; alſo *thrice* 285 is 855, which *divided* by 28, the *Remainder* is 15. Thus if you try on ſucceſſively, you will find, that 17 *times* 28 , which is 4845, is the Number required, the which *divided* by 28, the *Remainder* is an Unit. Hence then we ſhall find

$$\left.\begin{matrix}4845\\4200\\6916\end{matrix}\right\}\text{is equal to the Solid, or Product of}\left\{\begin{matrix}19,\ 15,\ 17.\\28,\ 15,\ 10.\\28,\ 19,\ 13.\end{matrix}\right.$$

For the *Demonſtration* of the *Theorem* propoſed we thus argue.

1. *Each* Multiplier *multiplied by its* Remainder, *is meaſured or divided by its own* Diviſor, *leaving ſuch a* Remainder *as is propoſed.* For before, each *Multiplier* was defined to be a *Multiplex* of its own *Diviſor*, *Plus* an *Unit*. Wherefore *multiplying* it by any *Remainder*, it doth only render it a greater *Multiplex* in the ſaid *Diviſor*, *Plus* an *Unit multiplied* by the *Remainder*; which is no other than the *Remainder* itſelf; but if 0 *remain*, that *Product* is deſtroyed.

2. *The* Sum *of the* Products divided *by each reſpective* Diviſor, *hath the* Remainder *aſſigned*. For concerning the firſt *Product*, it is by the firſt Section meaſured by its own *Diviſor*, leaving the *Remainder* propoſed; and if we add the reſt of the *Products* thereto, we only add a *Multiplex* of its own *Diviſor*, which in *Diviſion* enlargeth the *Quote*, but not the *Remainder*. Particularly the *ſecond Multiplier* is 28 × 15 × 10 × *Remainder*, all which is but a *Multiplex* of 28. And ſo the third *Product* is 28 × 19 × 13 × *Remainder*. And what hath been ſaid concerning the *Sum* of the *Products* being *divided* by the *firſt Diviſor*, and leaving the *Remainder* thereto aſſigned, may be ſaid of each reſpectively.

3. *The* Sum *of* Products divided *by the* Solid *of the* 3 Diviſors, *leaves a* Remainder *ſo qualified as the ſaid* Sum. For concerning the ſaid *Sum*, it is evident by the *Second hereof*, that it is no other than the *Firſt Product*, increaſed by adding a juſt *Multiplex* of the *firſt Diviſor*, that thereby we did only enlarge the *Quote*, not alter the *Remainder*: By the like Reaſon the *ſubſtracting* a juſt *Multiplex* thereof, doth only alter the *Quote*, not the *Remainder*; but the *Solid* of all 3 *Diviſors* multiplied here by the *Quote*, as there by the *Remainder*, is no other than a juſt *Multiplex* of the *firſt Diviſor*. Wherefore the *Remainder*, after this *Diviſion* is performed, is of the ſame Quality as the *Sum* of the *Products*; and *divided* by the *firſt Diviſor*, leaves the *Remainder* proper thereto. And the like may be ſaid concerning each *Diviſor*.

As in the Method hitherto delivered, we required the *Diviſors* to be *primitive* to each other; ſo, if we take the *Problem* as generally propoſed, in the Preface to *Helvicus's Chronologia*, we are told, *common Arithmetick* fails in the Solution thereof; and *Tacquet* denies it to be performable by the *Regula Falſi*, and being unlimited, we muſt do it by Trials. Wherefore, *When any two* Diviſors *with their* Remainders *are propoſed, try the* Multiplices *of one of them, increaſed by its* Remainder, *and* divide *by the other: If you find ſuch* Remainders *as are not for the Purpoſe, and that they are repeated, the* Problem *is* impoſſible.

Example. *Diviſors* $\left\{\begin{matrix}6.\\8.\end{matrix}\right\}$ *Remainders* $\left\{\begin{matrix}3.\\5.\end{matrix}\right.$

The *Multiplices* of 8, increaſed by 5, are 13, 21, 29, 37, 45, 53.
Thoſe *divided* by 6, the *Remainders* are, 1, 3, 5, 1, 3, 5.

Here you ſee 21 and 45, for the Purpoſe, and take the *Progreſſion*, adding the common Difference 24 (which is the leaſt *Dividend* meaſured by 6 and 8) and you have 21, 45, 69, 93, 117, 141.

Admit the Queſtion had concerned theſe 3 *Diviſors*:

6	The Remainders being	6	Then *dividing* the former *Progreſſion* by 9, the *Remainders* are 3, 0, 6, 3, 0, 6.
8		3	
9		5	

Wherefore I conclude, that the *3d* and *6th* of theſe Numbers are thoſe ſought, to wit, 69, 141, and ſo on progreſſively; whereas, if you had propounded the *Remainder* of 9 to have been any other Number than 3, 0, 6, the *Problem*, as concerning all theſe, had not been poſſible.

Some eaſy *Caſes* of the *Problem* are theſe: When the *Remainder* of ſome *Diviſor* is 0, and of each of the reſt of the *Diviſors* an *Unit*, or leſs by an *Unit* than the *Diviſor*: In which *Caſes* you are to find ſuch a *Multiplex* of the *Product* or leaſt *Dividend* meaſureable by thoſe *Diviſors* that have *Remainders*, which increaſed or diminiſhed by an *Unit*, may be a juſt *Multiplex* of that *Diviſor* that hath no *Remainder*.

Several chronological *Problems ſolved*; *by Mr.* J. Collins. *n.* 30. *p.* 572.

To find the Prime, Solar Cycle, *and* Indiction.

II. 1. To find the Year of the *Julian Period* for any *Year of our Lord* propoſed, it is neceſſary to be furniſhed with the *Prime*, *Cycle* of the *Sun*, and the *Number* of the *Roman Indiction*, which the induſtrious Mr. *Street* thus performs:

When 1, 9, 3, *to the Year hath added been*,
Divide *by* 19, 28, Fifteen;
The *Remainders* are the Numbers ſought.

The Uſe of the *Prime* is, to find the *Epact*, and thereby the *Moon's Age*, *Time* of *High-Water*, &c.

To find what Day *of the* Week *any* Day *of the* Month *happens.*

2. A farther Uſe of the *Sun's Cycle*, is to attain the *Dominical Letter*, and thereby *to know the* Day *of the* Week *on which any* Day *of the* Month *happens*. But this is more eaſily and with leſs Caution obtained, by finding on what *Day* of the *Week* the *firſt of March* happens for ever: In brief thus;

To the Number 2, *add the* Year of our Lord, *and its* even 4th Part, *neglecting what remains, if any*; *then* divide *that* Sum *by* 7, *and the* Remainder (*neglecting the* Quotient) *ſhews the Number of the* Day *of the* Week, *accounting* Sunday *firſt*. If 0 remain, the *firſt* of *March* falls on a *Saturday*. Thus $2+1669+417=2088$ being *divided* by 7, the *Remainder* is 2; ſhewing the *firſt* of *March* in the Year 1669, to fall on a *Monday*. If it were required to perform this for Years preceding our *Saviour's Nativity*, then take this Rule:

To the Year *add its* even 4th Part, *the* Sum divided *by* 7, *the* Remainder *ſhews the* Day *of the* Week, *accounting* Sunday *firſt*, Saturday *ſecond*, *and ſo* backward.

3. *To find what Day of the* Month, *in the* firſt Week *of each* Month, *happens to be on the* ſame Day *of the* Week, *as the* Firſt *of* March, uſe the (plain) following Verſes, in which the 12 *Words* relate to the 12 *Months* of the *Year*, accounting *March* the *firſt*.

Ask Endleſs Comfort, God Enough Beſtows,
From Divine Axioms Faith Confirmed Grows.

The Alphabetical Number of the *firſt* Letter of the *Word* proper to the *Month* propoſed, is the Anſwer; *e. g.* If the *Month* were *April*, the *Word* proper thereto is *Endleſs*, and *E* is the *5th Letter* in the Alphabet. Wherefore conclude, that the *Firſt* of *March*, and the *5th* of *April*, do for ever happen on the ſame *Day* of the *Week*.

4. *To find on what* Day *of the* Week *the* firſt Day *of each* Month *happens, ſuppoſing the* Firſt *of* March *known*: It might be reckoned from the former Problem; but the following *Verſes*, beginning with *March*, as the former, are more ready for the Purpoſe.

A Dreadful Fire, Beholders Daily Gaze,
Chaſtiz'd England. *Ah Cruel Fatal Blaze!*

Example. In the *Year* 1669, the *Firſt* of *March* is *Monday*; I would know on what *Day* of the *Week* the *Firſt* of *October* happens. The *Word* proper to the *Month* is *England*; then count alphabetically to *E*, *viz.* A. *Monday*; B. *Tueſday*; C. *Wedneſday*; D. *Thurſday*; E. *Friday*; which is the Day ſought.

Whence conclude, that the 1*ſt*, 8*th*, 15*th*, 22*d*, 29*th* Days of *October* are all *Fridays*. Thence it is eaſy to reckon on what *Day* of the *Week* any Day of that *Month* happen'd; and ſo for all other Months.

The Sun's *Entrance into any* Sign, *Ib. p.* 574.

5. *To find on what* Day *of the* Month *the* Sun *enters into any* Sign *of the* Zodiack; *ex ſuperabundanti*, we give the following Verſe.

Charles *Brought Content, Divers Effects Enſue,*
Envy, Fear, Dolour, Danger, Bids Adieu.

Here again the 12 *Words* relate to the 12 *Months*, *March* being the *firſt*. To the Number of the *Letters* of the Alphabet the *Word* begins with, add 7, *e. g. Fear* is the *Word* for *October*, and *F.* the 6*th* Letter: Wherefore the *Sun* enters into the 8*th Sign*, to wit, *Scorpio*, on the 13*th* of *October*.

The Rubricks *for the Seat of* Eaſter, *according to the* Julian Account, *explained; by Dr.* J. Wallis. *n.* 240 *p.* 185.

III. The fundamental Rule of the *Nicene Council* (which we pretend to follow) for the keeping of *Eaſter*, is to this Purpoſe; *Eaſter-Day* is to be that *Sunday* which falls *upon*, or *next after*, the *firſt Full-Moon* which happens next after the *Vernal Equinox*. This *Vernal Equinox* was then obſerved to fall on the 21*ſt* of *March*, though it does now fall on the 11*th* of *March*, or ſometimes on the 10*th* of *March*. And therefore, inſtead of *next after the Vernal Equinox*, we ſay, *next after the* 21*ſt of* March.

But then it is ſaid (by a Miſtake, I ſuppoſe, *after the firſt Full-Moon*, inſtead of *upon*, or *next after* the *Firſt Full-Moon* (for ſo it is to be underſtood) and added, *and if the Full-Moon happens on a Sunday, Eaſter-Day is the Sunday after*; which muſt needs be a *Miſtake:* For in ſuch Caſe, it is to be *that Sunday*, not the *Sunday after*. And ſo the Tables agree (contrary to this Note) both that *for* 40 *Years*, and that *to find Eaſter for ever*. And ſo it was obſerved, in the Years 1668, 1678, and 1682. And ſo whenever the Caſe happens that the *Eccleſiaſtical Full-Moon* falls on a *Sunday*.

The only Doubt remains, on what Day we muſt reckon the *Eccleſiaſtical Full-Moon* to fall: For we are not to judge either the *Equinox* or the *Full-Moon*, according as they happen in the *Heavens*, or in our *Almanacks*; but according to the *Paſchal Tables*, fitted to the Time of the *Nicene Council*. And accordingly we are to account the *Equinox* to be now (as then it was) on *Mar.* 21. The *Golden Number* (fitted to the *Cycle* of 19 Years, after the End of which, it begins again at 1, 2, 3, *&c.*) is placed in the firſt Column of our *Calendar*, to tell us on what Day (of ſuch a Year) the *New-Moon* is *ſuppoſed* to happen, in each Month; and the 15*th* Day of that *Moon* is *reputed* the *Full*. Thus the *Golden Number* for the Year 1698, is 8 (that is, this is the 8*th* Year of ſuch *Decem-novenal Cycle*, or Circle of 19 Years, commonly called *Cyclus Lunaris*, or the *Circle* of the *Moon*; as the other *Circle* of 28 Years is called *Cyclus Solaris*, the *Circle* of the *Sun*, or rather of the *Sunday Letter*.) And this Number 8 ſtands in the Calendar at *Mar.* 6; which we muſt therefore ſuppoſe to be *New-Moon* (though the *New-Moon* were indeed *March* 2.) Now *March* 6, being the *New-Moon*, or firſt Day of the *(reputed) Lunar Month* (for ſuch Year) *March* 20 will be the 15*th* Day, or the *(reputed) Full-Moon* for the Month of *March* this Year, which happens to be *Sunday*; the *Dominical Letter* for this Year being *B*. But this happening before *March* 21 (the *ſuppoſed Equinox)* cannot be the *Paſchal Full-Moon*; but we muſt wait for another: And we ſhall then find the *Golden Number* 8 ſtanding at *April* 5, for the *New-Moon* of *April*, the ſame Year. And therefore the *Full-Moon*, or 15*th* Day of that *(reputed) Lunar* Month, is to be *April* 19. Which being *Tueſday*, the *Sunday* next following is *April* 24 (where ſtands *B*, the *Sunday Letter* for this Year) which is therefore to be *Eaſter-Day*, according to the *Intent* of theſe *Tables*; and it was obſerved accordingly.

But it were to be wiſhed, there had been ſomewhere a *Rubrick* to direct how we are to find this *(reputed) Full-Moon*; and what is the Uſe of the *Golden Number*.

The Difference of the *Eccleſiaſtick* Account, in the *Paſchal Tables*, from that of the *Heavens* (both as to the *Equinox* and as to the *Full-Moons*) doth ariſe from hence:

1. The *common Julian Year* (by which we reckon) of 365 *Days* and 6 *Hours*, is ſomewhat too *long*; being about 11 *Minutes* of an *Hour* longer than the true *Solar* Year. By reaſon whereof, the *Equinox* (and other *annual* Seaſons) go forwards about 11 *Minutes* every Year: Which from the Time of the *Nicene Council* till now, amounts to about 11 Days; ſo that

the *Equinox*, which *then* happened *March* 21, is *now* come back to *our March* 10. Which upon Pope *Gregory*'s reforming the *Roman Calendar* (above 100 Years ſince) cauſeth the Difference of 10 Days between what we call the *New Stile* and the *Old Stile*.

2. It was *then* ſuppoſed, that in 19 Years (which is the Compaſs of the *Golden Number*) the *Lunations* (of *New-Moon* and *Full-Moon*) did return to the ſame Day and Hour as they were 19 Years before. But though this be pretty near the Truth, yet it comes ſhort by about an *Hour* and *half*: Which *Hour* and *half* in every 19 Years, doth ſince that Time, amount to 4 or 5 Days. Whence it comes to paſs, that the *reputed Full-Moon* is *later*, by 4 or 5 Days, than that of the *Heavens*. But our *Eaſter* is reckoned according to the *reputed Full-Moons* (derived from the *Golden Number*) not according to thoſe of the *Heavens*.

A Report of the Conſultation upon Mr. Dee's *Propoſal for* reforming *the* Calendar, A. 1582; *by the Lord Treaſurer* Burleigh. *n.* 257. *p.* 355.

IV. 1. It was agreed by Mr. *Digges*, Mr. *Savile*, and Mr. *Chambers*, that upon their ſeveral Peruſals of the Book, written by Mr. *Dee*, as a Diſcourſe upon the *Reformation of the vulgar Calendar* for the *Civil* Year, that they do allow of his Opinion, that whereas in the late *Roman Calendar reformed*, there are 10 Days cut off, to reduce the *Civil* Year to the State it was eſtabliſhed in at the *Council of Nice*, the better *Reformation* had been to have cut off 11 Days, and to have reduced the *Civil* Year according to the State it was in at the *Birth of Chriſt*. And ſo they all agree, that ſuch a *Reformation* had been more agreeable to the *Account of Chriſt*. And ſo they do alſo aſſent, that having Regard to the *Council* of *Nice*, the Subſtraction of 10 Days is agreeable to Truth: And therefore the better to agree with all Countries adjacent, that have received their *Reformation* of ſubſtracting 10 Days only, they think it may be aſſented unto without any manifeſt Error; having Regard to obſerve certain *Rules* hereafter for omitting ſome *Leap Years* in ſome hundred Years. And for the ſubſtracting of 10 Days, Mr. *Dee* has compiled a Form of a *Calendar*, beginning at *May*, and ending at *Auguſt*, wherein every of theſe 4 Months, *May*, *June*, *July*, *Auguſt*, ſhall have in the Ends of them ſome Days taken away without changing of any *Feaſt* or *Holy-Day*, Moveable or Fixed, or without altering the *Courſes* of *Trinity Term*; that is to ſay, *May* to conſiſt of 28 Days, taking from it 3 Days; *June* to have 29 Days, taking from it but one Day; *July* to conſiſt of 28 Days, taking from it 3 Days; *Auguſt* to conſiſt of 28 Days, taking from it 3 Days: All which Days *ſubſtracted* make 10 Days. In the which 4 Months no *Feſtival* Days are changed, but remain upon the accuſtomed Days of their Months.

And becauſe the *Roman Calendar* hath joined to it a great Company of *Rules*, of which only are capable the *skilful Computiſts* or *Aſtronomers*, it is thought good to make a ſhort Table like an *Ephemerides*, to continue the Certainty of all the *Feaſts Moveable*, depending only upon *Eaſter*, and agreeing with the *Roman Calendar*; which may ſerve for *one hundred*, or *two hundred Years*, and ſo be eaſily renewed when there ſhall be Occaſion for it.

2. The *Reformation* of the *Roman Calendar* propoſed by Mr. *Dee*, as I cannot wholly approve, ſo I cannot altogether diſapprove: For I like the *Subſtraction* of 10 *Days*, as the *Church of Rome* has done, beginning the *Computation* from the *Council of Nice:* Though it cannot be denied, but that the *Reformation* from the Time of *onr Saviour* had been much better. But ſince the *Fathers* of the *Council of Nice* thought it more Wiſdom to look forwards than to look backwards, and to have greater Care of avoiding Diſtractions in the Church, about the *Celebration* of *Eaſter* for the future, than to remedy the Errors paſt; I think we ſhould do well with the *Church* of *Rome* to follow their Example. And whereas ſome have thought of a more exact Calculation than this *Emendation*, introduced by Pope *Gregory* XIII, which they ground upon the late *Aſtronomical* Obſervations of the learned *Tycho Brahe*; yet ſince the Difference is not ſo great, as to make any ſenſible Error in many Ages, and ſince that Error may be eaſily corrected by the Omiſſion of an *intercalary Day*, I think it not fit, for ſo ſmall a Nicety, to make a new Diſſenſion in the Church. Much leſs am I of their Opinion, who think, that this Correction of the Year is therefore to be rejected, becauſe it comes recommended by the *Church* of *Rome*; which were all one as to refuſe ſome wholſome Potion, becauſe it is preſcribed by a Phyſician whoſe Manners we approve not of.

Conſidered An. 1645; *by Mr.* J. Greaves. *Ib. p.* 356.

But I cannot ſubſcribe to his Opinion, that this *Reformation* ſhould be by the *Subſtraction* of 10 *Days* out of *one* Year alone: For though I grant, that this were a quick Cure of a lingering Diſeaſe, yet it is againſt all Rules of Art, in curing one Malady to make 10. For it cannot be, but that the *Defalcation* of 10 *Days* in *one* Year muſt be of infinite Diſturbance in the Commonwealth in all *Contracts*, where neceſſarily a certain Time is defined. I ſhall therefore humbly recommend to his *Majeſty*'s Wiſdom and favourable Conſideration, that Courſe which was long ſince propoſed by many able Mathematicians to Pope *Gregory*, upon the firſt Notice of his Purpoſe of *correcting* the *Calendar*. The Manner was this; That for 40 *Years Space* there ſhould be no *Biſſextile* or *intercalary Years*, or, as we call them, *Leap Years*, inſerted in the Calendar. By which Courſe it is moſt evident that 10 *Days* will be *ſubſtracted* in 40 Years, and theſe 40 Years will be each of them *Anni Æquabiles*, conſiſting of 365 Days, as our common and ordinary Years do, without any Alteration in the whole Year. And this being beyond all Exception, had been readily entertained by Pope *Gregory*, had not his *Ambition* been greater than his Judgment; for he was willing to have the Honour of this *Emendation*, and not to leave it to his Succeſſors; whereby the Year ever ſince has been called *Annus Gregorianus*.

3. Againſt this Expedient of *obſerving no Biſſextile* for the *Space* of 40 *Years*, or now of 44 *Years*, there ſeems to me this great Objection. In the Time of *Julius* and *Auguſtus Cæſar*, there was a Year which was called *Annus Confuſionis*, upon the ſettling and reſettling the *Julian Year* (Of which *Kepler* gives an Account with the Miſchiefs of it) And the like in the Year 1582, when Pope *Gregory* did, at once, ſtrike out 10 *Days* of that

An. 1699. *by Dr.* J. Wallis. *Ib. p.* 348.

Tab. Rudulph.

Year. But if this Advice ſhould take Place, we ſhould now, inſtead of one *Annus Confuſionis*, have a Confuſion for 44 *Years* together; wherein we ſhould agree neither with the *Old* nor with the *New Account*; but be ſometimes 10 *Days*, ſometimes 9 *Days*, ſometimes 8 *Days* (and ſo forth) later than the *one*, and ſooner than the *other* Account. And a Foreigner would not be able to judge of an *Engliſh Date*, without knowing in which of theſe Years we vary 10, 9, or 8 *Days* (and ſo forth) from either of theſe *Accounts*: And this for 44 *Years* together. Which ſeems to me a much greater *Confuſion*, than if (as in 1582) we ſhould *(once for all)* caſt out 11 *Days*. But I cannot think it adviſeable to do *either*.

The Julian Account *not to be changed for the* Gregorian; *by Dr.* J. Wallis, *n.* 257. *p.* 343. 350.

V. Concerning the *Alteration*, at this Time ſuggeſted of the *Julian Account* for the *Gregorian*, I am at a Loſs what to ſay. That there is in our *Eccleſiaſtical* Computation of the *Paſchal Tables* ſomewhat of Diſorder, is not to be denied: But I am very doubtful, that if we go to *alter* that, it will be attended with greater Miſchief, than the preſent Inconvenience. By removing *Ptolemy's firſt Meridian* (though upon ſome plauſible Pretences) it is now come to paſs, that we have (in a manner) *no firſt Meridian* at all; but every new *Map-maker* placeth his *firſt Meridian* where he pleaſeth; which hath brought a great *Confuſion* in *Geography*. It is agreed by moſt (if not all) *Chronologers*, that as to the *Year of our Lord*, the *Annus Vulgaris* is not the *Annus Verus* (though it be not agreed how much it differs) But it would be a horrible *Confuſion* in *Hiſtory*, if we ſhould now go about to alter this *Vulgar Account*. And as to the Diſorder in the *Paſchal Tables*, it was a Thing noted and complained of for 3 or 400 Years, before Pope *Gregory* did (unhappily) attempt the *Correction* of the *Kalendar*. But it was all that Time thought adviſeable, rather to ſuffer that Inconvenience, than, by *correcting* it, to run the Hazard of a greater Miſchief.

The *Celebration* of *Eaſter* a *Week* or a *Month* ſooner or later, doth not influence at all our ſolemn *Commemoration* of *Chriſt's Reſurrection*. But if it be thought neceſſary, that the *Seat* of *Eaſter* ſhould be *rectified*, and the *Paſchal Tables* corrected (and Pope *Gregory* made no other Pretence) that may eaſily be done. For, if in the *Rule* for *Eaſter*, inſtead of ſaying *next after the 21ſt of* March, you ſay, *next after the Vernal Equinox*, the Work is done; and we might be excuſed the Trouble of *Paſchal Tables*, and the intricate Perplexities of the *Gregorian Epacts*: For then every *Almanack* will tell you when it is *Equinox*, and when it is *Full-Moon*, for the preſent Year, without diſturbing the *Civil Account*. And this Pope *Gregory* might as well have done, without troubling the *Account* of *Chriſtendom*. But if he would needs diſturb the *Civil Year*, he ſhould have *rectified* it (not to the Time of the *Nicene Council*, but) to the Time of our *Saviour's Birth*: For our *Epocha* is not from the *Nicene Council*, but from the *Birth* of *Chriſt*. And moſt certain it is, that at our *Saviour's Birth* the *Vernal Equinox* was not on the *21ſt* of *March* (as the *New Account* would ſuppoſe) but nearer to the *25th*.

However, this pretended *Reformation* of the *Kalendar* introduced that *Confuſion* of *Old* and *New Stile*, which we now complain of; and which now can never be remedied, unleſs all Nations ſhould, *at once*, agree upon *one*: I ſay *at once*; for if ſome ſooner, and ſome later do *alter* their *Stile*, the *Confuſion* (in *Hiſtory*) will yet be greater now it is. It is true, that upon Pretence of the Pope's (uſurped) *Supremacy* in *Spirituals* (and in *Temporals* alſo in order to *Spirituals*) moſt *Popiſh Countries* (but I think not all) have ſubmitted their *Civil Year* (as well as their *Eccleſiaſtical*) to the ſingle Authority of the *Pope's Bull*. But the *Church* of *England* had long before this pretended *Correction* renounced the *Pope's Supremacy*, and is therefore unconcerned in it: And I ſee no Reaſon why (after ſo long a Diſclaimer) we ſhould be *now* fond to re-admit it: For what greater Evidence (of owning that *Authority*) can (in Practice) be expected, than obeying their Commands in Things (otherwiſe) unadviſeable? No doubt the *Hand of Joab* is in this Matter, though perhaps we do not ſee it. Beſides, this *Alteration* cannot be made without altering the *Common Prayer-book* (for, at leaſt, all the *Kalendar* muſt be new framed) And ſome are ſo warm againſt touching that in the leaſt, that they are even againſt conſidering, whether ought in it may be changed for the better. Had this been ſtarted in King *James*'s Time, with what Face would it have looked? And if the Mask be taken off, the Face is ſtill the ſame.

But it is not *England* alone that uſeth the *Julian Year*; but all the three Kingdoms of *England*, *Scotland*, and *Ireland*, and all our *Foreign Plantations*, which are not a few; and the two Kingdoms of *Denmark* and *Sweden*; the *Proteſtant Cantons* of *Switzerland*; and four of the ſeven *United Provinces*; and many of the *Proteſtant States* in *Germany*. So that if *we* ſhould change our *Stile* in Compliance with ſome of our *Popiſh* Neighbours from whom we differ, we ſhould then vary from the Proteſtants with whom we now agree; and particularly from *Scotland*, with whom we are more concerned to agree than with *France*. A new *Law* in *England* would not compriſe *Scotland*; and we cannot promiſe ourſelves that they would preſently comply alſo: They are not ſo pliable to the *Modes* of *Rome* as ſome in *England* are; as is evident in their not admitting *Epiſcopacy*; and the Buſineſs of *Eaſter* (which was the ſole Pretence for the firſt *Alteration*) would to them ſignify nothing, who (according to their Conſtitution) obſerve no *Eaſter* at all, but do rather declare againſt it.

If it be ſaid, that the other *States* may, in Time, be induced to follow our Example: Perhaps ſome may (not all) But this would but make the *Confuſion* yet greater. For thenceforth, we muſt be obliged (if we would underſtand their *Dates*, and be at a Certainty in *Hiſtory*) not only to know what Countries do uſe this or that *Stile*, but from what Time they began ſo to do. So that there will ſtill be as great Neceſſity of *S. V.* and *S. N.* (*Old Stile* and *New Stile*) as now there is: And with that *Diſtinction* we are now as eaſy as if we change.

That the *Old Julian Year* is, in itſelf, a better Form, and more adviſeable than the *New Gregorian*, is ſo notorious, that all *Aſtronomers* (even *Papiſts* themſelves) are fain firſt, to adjuſt their *Calculations* to the *Julian Year*, and thence transfer them to the *Gregorian*. The *Equinox* going backward (for 10 or 11 *Minutes* each Year) is very inconſiderable, and which, in *Celeſtial* Computations, is eaſily rectified; as are many other Inequalities of much greater Concernment. And I think it was never pretended that the *Civil Year* muſt needs agree (exactly to a *Minute*) with the *Celeſtial*; and if never ſo much affected, is impoſſible to be had. For the *Solar Tropical Year*, and the *Sidereal Year*, differ more from each other than the *Julian* from either; which is a Middle betwixt them.

It would therefore be much more adviſeable (if the *Papiſts* would be as compliant as they would have us to be) for the *Papiſts* to return to their *Old Julian Year*, than for us to embrace their *New Gregorian*; and it might much eaſier be effected: For, if the *Pope* could be perſuaded to grant a *Bull* to that Purpoſe, all the *Papiſts* would, *at once*, be as much obliged ſo to do, as by *Pope Gregory*'s *Bull* to vary from it. If it be ſaid, there is no Hope of that, then the Argument ſtands thus: If the *Pope* will not leave his *pretended Supremacy*, then we muſt *admit* it. But this ſurely is no Inducement for us to exchange our better *Julian Year* for one that is much worſe.

The Concluſion of the Proteſtant States *in* Germany, An. 1669, *for* reforming *the* Calendar; *by* . . . . *n*. 260. *p*. 459.

VI. The *Proteſtant States* of the *Empire* in the *Imperial Diet* of *Regenſburg*, having deliberated upon the projected *Reformation* of their *Almanacks*, have reſolved on the following Particulars.

1. That after the 18*th* of *February* 1700 *Old Stile*, the following 11 *Days* ſhall be left out in the *Almanacks*, and the *Feaſt* of St. *Matthias* be kept on the 18*th* of *February* aforeſaid.

2. The *Computation* of *Eaſter*, and the *Feaſts* thereon depending, ſhall, for the future, be calculated according to the true *Aſtronomical Calculation*; and this to continue only for this following *Century*, the *Aſtronomers* being left at Liberty, in the mean time, to conſult on further Methods, to prevent any further *Variation*.

The *Mathematicians* ſhall be ordered to conſider how for the future the Abuſe of *judiciary Aſtrology* in the *Almanacks* may be aboliſhed.

This *Reſolution* doth not proceed from any Condeſcendence to the *Roman Catholicks*, nor can be interpreted an accepting of the *Gregorian Kalendar*, conſidering, 1. The *Omiſſion*, or leaving out of theſe 11 *Days* intercalated, is quite different from that which they had done before; for here the *Calculation* of Time is only reduced to the Courſe of the *Sun*, as it was before the *Nicene Council*. 2. Wherefore the principal Thing in the *Gregorian Kalendar*, and the *Gregorian Cyclus*, is yet retained by them. 3. The *Aſtronomical* Computation of *Eaſter* in the *New Kalendar*, is a perpetual and annual real Proteſtation againſt the Injunction of Pope *Gregorius*; and yet 4*thly*, the different Methods of Computation (the *Aſtronomical* which we uſe, and the *Cyclus* which they uſe) to find the *Eaſters* and *Feaſts* depending thereon, makes no great Difference in the thing itſelf, except in one only caſe, otherwiſe they fall every Year on the ſame Day. This Caſe is, that *our Eaſter* will fall 8 Days later than *theirs*, when the *æquinoctial Full-Moon* ſhall fall too near a *Sunday*. For then the *Gregorians*, according to their *Cyclus*, will obſerve their *Eaſter* on the *Sunday* immediately following: But the *Proteſtants*, to avoid obſerving *Eaſter* on the ſame Day with the *Jews*, which, according to the *aſtronomical Calculation*, keep their *Eaſter* 8 Days after; and that, according to an antient *Rule* and Practice of the *Chriſtian Church*, which when *Eaſter Full-Moon* fell on a *Saturday*, and that *Saturday* happened to be the 21ſt of *March*, then the *Eaſter* is to be obſerved on the *Sunday* following, 8 *Days* after.

This *Reſolution* will not be an Occaſion of any further *Variance* and Difference in the *Computation* of Time. For, 1. The numbering of the Days continues uniformly without any Difference all the next *Century*; and before this *Century* be ended, a Method will be found, to agree about the *ſecular intercalary Day*. 2. The *Gregorian Kalendar* does not depart much, nor will hereafter, from the *Courſe* of the *Heavens* and the *Canons*; and, except in the aforeſaid Caſe, the *Computations* of *Eaſter* will every Year actually agree. 3. It is not now neceſſary to trouble ourſelves with the feared notable removing of *Eaſter* from its due *Term*, which the *Gregorian Calendar* will occaſion; for before that happens, if the World ſhall ſtand yet many Ages, Means will be found to prevent it.

If any *Correction* of the *Gregorian Kalendar* ſhould happen (which is hardly to be preſumed), yet our *aſtronomical Calculation* will always be more accurate than their *Cyclus*, and if they will not tranſgreſs againſt the *Canons*, and the Courſe of the *Heavens*, they muſt comply with us. It being thought fit that 11 *Days* ſhould *at once* be left out, it was alſo thought beſt to do it immediately before the *1ſt* of *March St. No.* and that in the *Year* 1700, inſtead of writing and numbering after the 18*th*, the 19*th* of *Feb.* to write the *1ſt* of *March*; and that becauſe, 1. In theſe 11 *Days* is no *Feaſt-Day*, and St. *Matthias* falls on a *Sunday*, ſo that it's all one whether it be obſerved on the one or the other *Sunday*, 8 *Days* ſooner or later. 2. Becauſe thus the *Old* and *New Stile* will be fully *united* and reconciled, and that *at once*.

A **new Luni-ſolar** *Year, and a* **perpetual Almanack,** *by Mr.* **R. Wood.** *Ph. Col.* **n. 2. p. 26.** *Fig.* **2, 3.**

VII. The *Garter* ſhews the *Number* of *Days* (30, 29, 30, 29, *&c.*) which each of theſe 12 *Months* of the Year is to contain; and in the *Buckle* is diſcovered, through a *Hole*, the Days of a 13*th Month* (31, 30, 31, 30, *&c.*) to be added to the Years 2, 5, 7, 10, 13, 15, 18, 21, 24, 26, 29, 32, 34, 37,; in all to 14 of 38, as in a *Cycle* behind; which being ſuppoſed moveable one 38*th* Part every Year backwards or contrary to the Months in the *Garter*, its Revolution is completed in 38 Years: And the 38*th* Year current, or the Year of the *Period* or *Cycle*, is ſhewed through another Hole.

Once every *Century*, or to one Year in 100, add *one* Day, *viz. To the firſt* 50th Year, *or middle of the* Century, *or rather to the firſt* 70th Year *(becauſe the firſt* New-Moon, March 10, 1680, *happens a little after* Midnight, *and after the* Vernal Equinox), *and then to every* 100th Year *following*; *which* additional Day *being* omitted *every* 230th *or* 240th Century *(or near thereabouts, if any one ſhall require ſuch great Exactneſs) will balance the* Account *for ever.*

The *New Year*, and *Account*, may beſt begin with the *Vernal Equinox*; or rather with the Day of the *New-Moon* happening near Midnight about that Time, as *March* 10, 1680.

The *Egyptian Hieroglyphick* of the *Year* was a *Serpent* carved into a Circle or Ring, with Tail in Mouth; but the *emblematical Garter* will be much more proper for *England*; and is ſo exactly fitted to the *Moon's Motion*, that one Day will not be loſt or got in *Millions* of *Years*.

This *(a) Almon-ac* meaſures Time principally by the *Moon*; but with a great and near reſpect to the *annual Motion* of the *Sun* on Earth. The Unit, or leaſt Meaſure, is a *Day*; and the *Garter* or *Luni-ſolar Year* will be at a Medium within about a Week, or half a hundredth Part of the true *Solar Year*; that is, ſo near, that the Difference will not be diſcerned by ordinary popular Obſervation (and therefore muſt needs anſwer the Ends of *Huſbandry* and other *civil Affairs* well enough), and come often near, and ſometimes very near; and at certain *Periods* they balance one another, and have a kind of Coincidence or Agreement, much better than the *Sun's Courſe* has with the *Italian Account*, ſo much magnified by *Scaliger* and *others*.

(a) Almon-ac. *Our* Anceſtors *uſed to carve the* Courſes *of the* Moon *of the whole* Year *upon a* Squared Stick, *which they called an* Almon-aght, *that is,* Al-moon-heed. Verſtegan. *p.* 58. *The* Dutch Al-mean-acht *imports the ſame.*

I find the elder World generally *computed* their Time (and moſt of the *Eaſtern* Countries, if not the Bulk of Mankind, do ſo ſtill) by the *Moon*, or by the *Lunar*, or *Luni-ſolar Year*, made up of *Moons*, or real *Months*, or ſomewhat near the Matter ſuch; which *Months* were for the moſt part 12, and ſome Years 13. This appears from their *Kalendars*, &c. 'Tis plain (from 1 *Sam. c.* xx. *v.* 5, 18, 24, compared with *v.* 27, 34) that the Days of the *Jewiſh Month* were the ſame with thoſe of the *Moon*: And the *Grecians* (where *Aſtronomy* as well as other Arts and good Learning moſt flouriſhed) and particularly the *Athenians* (according to the Inſtitution of their wiſe Legiſlator *Solon*) did thus reckon their Time; and ſo did the *Romans* too, till *Julius Cæſar* altered, I cannot ſay mended, the Year.

Among the *Grecians* there lived, in three not far diſtant Ages, three famous *Aſtronomers* in their ſeveral Times, *Meton*, *Calippus*, and *Hipparchus*, each of whom ſtill farther improved *Aſtronomy*, and rectified the *Accounts* of *Time* more and more one after another reſpectively, according to their Light, and the Obſervations of their own and the foregoing Ages. *Hipparchus*, the laſt of them, flouriſhed about 100 or 90 *Years* before *Julius Cæſar* altered the Year: Yet *Cæſar*, or his *Aſtronomer Soſigines*, followed *Calippus* in framing the *Julian Year*; as I find by examining their *Accounts*. For *Calippus's Period* of 76 *Years* conſiſted of 27,759 *Days*, and ſo do 76 *Julian Years*. About 3 *Centuries* and a half after *Cæſar*, the *Council* of *Nice* (firſt) and about 2 *Centuries* after that *Dionyſius Exiguus* (again) introduced the *Decennoval Cycle* (called the *Golden Number*) for the *Celebration* of *Eaſter*, following *Meton*, the *firſt* and *leaſt exact* of the *three*; or rather following both *Meton* and *Cæſar*, two Maſters, who were neither of them the beſt, and would, after ſome Time, diſagree, and part further from each other though both *Cæſar* and the *Church* might have had a much better Copy from *Hipparchus:* Which Miſtakes of theirs (and their Eyes being dazzled with the *Sun*, whereas they might more ſafely have looked on the *Moon)* have occaſioned thoſe *Anticipations* and Differences that have embarraſſed the *Accounts* of *Time*, and theſe Parts of the World in the ſucceeding Ages. And though many have propoſed laudable Ways of redreſſing the ſaid *Accounts*, yet ſtill building upon the old Foundations which were infirm, Pope *Gregory* XIII. in his *Reformation* of the *Kalendar*, about 100 Years ſince, was neceſſitated to wave the *Golden Number*, and yet he has but palliated the Diſeaſe; ſo hard it is to cure an Error in the firſt Concoction.

The *Council* of *Nice* appointed *Eaſter* to be kept the *firſt Sunday after the firſt Full-Moon after the 21ſt of March*, becauſe the *Vernal Equinox*, which was on the *25th* in our *Saviour's Time*, was then come to be on the ſaid *21ſt Day*; and therefore the *Gregorian Reformation* has reduced the *Vernal Equinox* back to that Day: But in this *Garter-Year*, *Eaſter* will always be the *firſt Sunday after the firſt Full-Moon of the New Year*; that is, after the *Vernal Equinox*, according to the true Intent and Meaning of the *Nicene Council*, or as it was in the *primitive* Times, and be but a Week *moveable*, or a Month *leſs moveable* than now, either after the *Old* or *New Stile:* Which might perhaps have prevented the Difference, or ſerved as an *Expedient* for reconciling the *Weſt* and *Eaſt Churches*.

The three *Cycles* of *Meton*, *Calippus* and *Hipparchus*, were all of them too large for the *Sun*, and primarily intended for the *Moon*, or for a *Luniſolar Year*; however, that of *Hipparchus* was neareſt to both, and very near the *Moon's Period*.

Perhaps, at firſt View my 38 *Years Period* may be looked upon but as a *double Metonic*, or *Semi-Calippic* one, *&c.* But upon farther Conſideration, it will be found otherwiſe: For *Meton* and *Calippus* their *Periods*, as alſo that of *Hipparchus*, were all of them too big, not only for the *Circuit* of the *Sun*, as I ſaid before, but for that of the *Moon* alſo; whereas *mine*, on the other hand, is too little for either, and needs one *additional* Day in near about every 100 Years.

Meton's 19 Years *Cycle*, or *Enneadecaeteris*, *had* 6940 *Days*, the *Double* whereof is — — — } 13880

Calippus's Period, or 76 *Years*, had 27759 *Days*, the *Half* whereof is — — — — } $13879\frac{1}{2}$

Hipparchus's Period, or 304 *Years*, had 111035 *Days*, the *8th* Part whereof is — — — } $13879\frac{3}{8}$

Whereas *my* 38 *Years Period* hath but juſt *Days* — — 13879

So that it may eaſily appear to any one who ſhall pleaſe to examine it, wherein my *Cycle* or *Period* differs from all theirs: But the Frame of my

Contrivance of this ſo nice Matter, for the eaſy Explication thereof, even to the groſſeſt Capacities, as to Practice and Uſe, is wholly different from theirs, and every one's elſe I ever yet heard of.

I choſe rather to take the *Revolution* of the *Moon*, than that of the *Sun*, for my chief and primary Meaſure of *Time*: Becauſe, *firſt*, the *Lunar Phaſes*, and conſequently *Months*, are more eaſily diſcerned, than the *Sun's Annual Period*, even by the moſt ignorant vulgar Eyes; who need but look up, almoſt any Night, to ſee their *Almonac*. *Next*, The Obſervations upon the *Moon*, made by the more knowing Men, have been more in Number, more exact, and of far greater Antiquity; *Aſtronomers* having had the Help of *Eclipſes* of very diſtant Ages for their Guide, in finding out very near the true Meaſure of the *Moon's mean Motion*. *Laſtly*, Keeping an *Account* by the *Moon*, we may reckon by the *Sun* alſo, that is to ſay, by *Months* and *Years* too; whereas, on the contrary, reckoning by a *Solar Year*, the *Months* are but empty Names, and, in *meaſuring* of *Times* and *Seaſons*, the *Moon* is rendered of no Uſe; though ſome *inanimate* Bodies (ſo conſiderable, that they take up and poſſeſs perhaps half this our Globe) as the *Seas*, do exactly obſerve the *Moon's Courſe*; and there are *living* Creatures alſo, thought perhaps no leſs conſiderable at Land, that do the like; which I need not mention, nor take any farther Notice of the near Affinity, if not Conſanguinity, with the Garter.

The Time and Place of Cæſar's Deſcent *upon* Britain; *by Mr.* Edm. Halley. *n.* 193. *p.* 495.

VIII. The Authors that mention *Cæſar's Expedition* into *Britain* with any Circumſtances, are *Cæſar* himſelf and *Dion Caſſius*. It is certain that this Expedition of *Cæſar* was in the Year of the *Conſulate* of *Pompey* and *Craſſus*, which was in the *Year* of *Rome* 699, or the 55*th* before the uſual *Æra* of *Chriſt*; and as to the *Time* of the *Year*, *Cæſar* ſays, that *Exiguâ parte Æſtatis reliquâ*, he came over only with two *Legions*, *viz.* the 7*th* and 10*th*, and all *Foot*, in about 80 Sail of Merchant Ships, 18 Sail that were ordered to carry over the *Horſe*, not being able to get out at the ſame Time from another Port, where they lay *Wind-bound*. He ſays, that he arrived about the 4*th Hour* of the *Day*, *viz.* between 9 and 10 in the Morning, on the Coaſt of *Britain*; where he found the Enemy drawn up on the Cliffs ready to repel him; which Place he thus deſcribes, *Loci hæc erat natura, adeo Montibus anguſtis Mare continebatur, ut ex locis ſuperioribus in Littus Telum adjici poſſit*; by which the Cliffs of *Dover* and the *South-Foreland* are juſtly deſcribed; and could be no other Land, being, he ſays in the 5*th Book* of his *Commentaries*, *in* Britanniam *Trajectum eſſe cognoverat circiter* Millium Paſſuum Triginta *à Continenti*. Here he ſays he came to Anchor, and ſtayed till the 9*th Hour*, or till about between 3 and 4 in the Afternoon, expecting till the whole Fleet was come up; and in the mean time called a *Council* of *War*, and advertiſed his Officers, after what Manner they were to make their *Deſcent*, particularly in relation to the *Surff* of the *Sea*, whoſe Motion he calls *Celerem atque Inſtabilem*, quick and uneven. Then, *viz.* about 3 in the Afternoon, he weighed Anchor, and having got the Wind and Tide with him, he ſailed about 8 *Miles* from the *firſt Place*, and anchored againſt an open and plain Shore. Here he made his *Deſcent*, and, having told us the Oppoſition that was made, and the Means he uſed to get on Shore, he comes to ſay, after that he had been 4 *Days in Britain*, the 18 Ships with his *Horſe* put to Sea, and were come within Sight of his *Camp*, when a ſudden Tempeſt aroſe, with contrary Wind, ſo that ſome of the Ships put back again, others were driven to the *Weſtward*, not without great Danger; and, coming to an Anchor, they found they could not *ride* it out: So when Night came on, they put off to Sea, and returned from whence they came. The ſame Night it was *Full-Moon*, which makes the *greateſt Tides* in the *Ocean*, and they being ignorant thereof, their *Gallies*, which were drawn on Shore, were filled by the *Tide*, &c. Then he ſays, that the *Day* of the *Autumnal Equinox* being at hand, and after ſome Days Stay, wherein there paſſed no Action, becauſe he kept cloſe in his Camp by the Shore, and not thinking it proper to ſtay till the *Winter* came on, he returned into *Gallia*. The next Year he made a further *Expedition* with 5 *Legions* and a good Body of *Horſe:* But there is little in the Hiſtory thereof ſerving to our Purpoſe, excepting that he ſays, he ſet Sail from the *Portus Icius* about *Sun-ſet* with a gentle S. W. Wind, *Leni Africo profectus*; that about *Midnight* it fell calm, and being carried away with the *Tide*, by the Time it was Day, he found he had left *Britain* on the *Left-hand*; but then the *Tide* turning, they fell to their Oars, and by *Noon* reached that Part of the Iſland where he *landed before*, and came on Shore without Oppoſition; and then marched up into the Country, leaving his Ships at Anchor *in Littore molli & aperto*.

Dion Caſſius, ſpeaking of the Landing of *Cæſar*, ſays, οὐ μέντοι ϗ ᾗ ἔδει προσέσχε; that is, as I tranſlate it; but he *landed* not where he intended; For that the *Britains*, hearing of his Coming, had poſſeſs'd all uſual Places of *Landing*, Ἄκραν οὖν τινὰ προὔχουσαν περιπλεύσας ἑτέρωσε παρεκομίσθη. Κἀνταῦθα τοὺς προσμίξοντας οἱ ἐς τὰ τενάγη ἀποβαίνοντι νικήσας, ἔφθη τῆς γῆς κρατήσας. In my *Engliſh*, Wherefore doubling a certain Head-land, he made to the Shore on the other Side, where he overcame thoſe that skirmiſhed with him at the *Water*'s *Edge*, and ſo got well on Land.

From theſe *Data*, that it was in the Year of the *Conſulate of Pompey* and *Craſſus*; that it was *Exiguâ parte Æſtatis reliquâ*, and 4 *Days* before a *Full-Moon*, which fell out in the *Night-time*; the Time of this Invaſion will be determined to a *Day:* For by the *Eclipſe* of the *Moon*, whereof *Druſus* made ſo good Uſe to quiet the Mutiny in the *Pannonian* Army, upon the News of the Death of *Auguſtus*, it follows that *Auguſtus* died *Ann. Chr.* 14, which was reckoned *Anno Urbis Conditæ* 767; and that this Action was 68 *Years* before, *viz.* in the 55*th Year before Chriſt* Current. In which Year the *Full-Moon* fell out *Aug.* 30, after Midnight, or 31 in the Morning before Day. The preceding *Full-Moon* was *Aug.* 1, ſoon after Noon; ſo that this could not be the *Full-Moon* mentioned, as falling in the Day-time: Nor that in the Beginning of *July*, it being not 10 Days after the *Summer Solſtice*, when it would not have been ſaid *Exiguâ parte Æſtatis reliquâ*. It follows, therefore, that the *Full-Moon* ſpoken of, was on

Auguſt the 30*th* at Night, and that the *Landing* on *Britain* was *Aug.* 26, in the Afternoon, about a Month before the *Autumnal Equinox*; which agrees to all the Circumſtances of the Story in Point of *Time*.

As to the *Place*; the *High-land* and *Cliffs* deſcribed, being allowed by all to be thoſe of *Dover*; it only remains to examine whether the Deſcent was made to the Northward or Southward of the Place where he firſt anchored. The *Data* to determine this, are 1*ſt*, that it was 4 *Days* before the *Full-Moon*. 2. That that Day by 3 *of the Clock* in the Afternoon, the *Tide* ran the ſame Way he ſailed. 3. That a *S.* by *E. Moon* makes *High-water* on all that Coaſt, the *Flood* coming from the *Southward*. Hence it will follow, that that *Day* it was *High-water* there about 8 *in the Morning*, and conſequently *Low-water* about 2; wherefore by 3, the *Tide* of *Flood* was well made up; and it is plain that *Cæſar* went with it; and the *Flood* ſetting to the Northward, ſhews that the *open plain Shore*, where he *landed*, was to the Northward of the *Cliffs*, and muſt be in the *Downs*. A 2*d* Argument is drawn from the *Wind* wherewith he ſet out on his ſecond Expedition, *viz.* S.W. as appears by the Words *Leni Africo profectus*, with which the Navigation of theſe Times would hardly permit a Ship to ſail *nearer the Wind* than 8 Points, or a N. W. Courſe; which would ſerve, indeed, to go into the *Downs*, but would, by no means, fetch the Lowland towards *Dengeneſs*, which is much about Weſt from *Calais*, and not more than W. N.W. from *Boulogn*, if it ſhall be ſaid, that that was the *Portus Icius* from which *Cæſar* ſet out. Whence I take it to be evident, that if *Cæſar* was not bound more northerly than the *South-Foreland*, he could not have thought the *Africus* or *S. W. Wind* proper for his Paſſage, which was then intended for the Place where he firſt landed the *Year before*.

Juſtly to determine which the *Portus Icius* was, I find no-where ſufficient Grounds; only *Ptolemy* calls the *Promontory* of *Calais-Cliffs* by the Name of Ἴκιον ἄκρον· whence there is Reaſon to conjecture, that the *Portus Icius* was very near thereto, and that it was either *Ambleteuſe* on one Side, or *Calais* on the other. The ſame *Ptolemy* places Γεσορρίακον ἐπίνειον in the ſame Latitude with the Ἴκιον ἄκρον, but ſomething more to the Eaſt: Which ſeems to refute thoſe that have ſuppoſed the antient Port of *Geſſoriacum* to have been *Boulogn*; whereas by *Ptolemy*'s Poſition, it muſt be either *Dunkirk* or *Gravelingue*, but the former moſt likely, both by the Diſtance from the Ἴκιον ἄκρον, being about 20 Miles, or half a Degree of *Longitude* to the Eaſt, or $\frac{2}{7}$ of the whole Coaſt of *Flanders*, which he makes but a Degree and Quarter from the *Acron Icion* to the Mouth of the *Scheld*, which he calls *Oſtia Tabudæ*; as alſo for that *Pliny*, l. 4. c. 16, ſpeaking of *Geſſoriacum*, ſays the *Proximus Trajectus* into *Britain* from hence is 50 Miles, which is too much, unleſs *Geſſoriacum* were ſomething more eaſterly than *Calais*. *Dion Caſſius* makes the Diſtance between *France* and *Britain* 450 *Stadia*, or 56 Miles, and ſays, likewiſe, it is the neareſt, τὸ συντομώτατον. But this is in Part, amended by the Explication given in the *Itinerary* of *Antoninus*, where the Space between *Geſſoriacum* and *Rutupium* is ſaid to be 450

Stadia (for this was the ordinary Paſſage of the *Romans* into *Britain*) *Rutupium* being more northerly, and *Geſſoriacum* more eaſterly than the *Termini* of *Cæſar*'s Voyage, and, conſequently, the Diſtance more than 30 Miles, which *Cæſar* had obſerved; and now lately an accurate Survey has proved the Diſtance, between Land and Land, to be 26 *Engliſh* Miles, or 28½ *Roman* Miles; which ſhews how near *Cæſar*'s Eſtimate was to the Truth.

A farther Argument (but not of equal Force with the former, becauſe of the Modernneſs of the Author, who writ above 150 Years after) may be drawn from the Words of *Dion Caſſius*, where he ſays, Ἄκραν τινὰ περιέχουσαν, περιπλεύσας ἑτέρωσε παρεκομίσθη, that after his firſt anchoring he ſailed about a Promontory to the Place where he landed. Now there are no other Promontories on all that Coaſt but the *South Fore-Land* and *Dengeneſs*; the latter of which it could not be, becauſe *Cæſar* ſays, he ſailed but 8 Miles, and the *Neſs* itſelf is about 10 Miles from the South and neareſt End of the Chalk-Cliffs, by the Town of *Hithe*; and to have gone round that Point to the other Side, the Diſtance muſt have been much greater. So that the Promontory ſpoken of by *Dion*, muſt needs be the *South-Foreland*, and *Cæſar* muſt needs anchor near overagainſt *Dover*; from whence ſailing 8 Miles, he would double a Head-Land and come to the *Downs*; which is ſuch a Coaſt as he deſcribes in one Place by *Apertum ac Planum Littus*, and in his *5th Book*, by *Molle ac Apertum Littus*.

As to *Dion*'s Words, ἐς τὰ τενάγη, which I have tranſlated *at the Water's* p. 5, 498.
Edge, I have the Authority of *Suidas* for doing it, who ſays, τέναγος, πελαγία ἰλύς, or *the Sea Mud*, and is therefore properly the *Ouſe* on the *Sea-ſhore*. And the *Etymologiſts* derive it from τέγγω, *Madefacio*, becauſe the Waſh and Breach of the Sea do always keep it *wet*. And this Word τὰ τενάγη is uſed by *Polybius* for the *Sea-Ouſe*; and in another Place he ſpeaks of the Difficulty of landing at the Mouth of a River διὰ τὴν τεναγώδη πάροδον *ob Limoſum Acceſſum*; ſo that it is not to be doubted that it ought to be rendred in this Place, *ad Vadum Maris*, rather than *in Paludibus*. And ſo this Objection againſt the Aſſertion that *Cæſar* landed in the *Downs*, which is known to be a firm Champaign Country, without Fens and Moraſſes, will be removed; and the whole Argument will, 'tis hoped, be admitted by the Curious.

IX. Here are found at *York*, in the Road, or *Roman-Street*, without *Midſel-gate*, and likewiſe by the River-ſide, where the Brick-Kilns now are, *Urns* of three different Tempers, *viz.* 1. *Urns* of a *bluiſh grey* Colour, having a great Quantity of coarſe Sand wrought in with the Clay. 2. Others of the ſame Colour, having either a very fine Sand mixed with it full of *Mica*, or *Cat-ſilver*, or made of Clay naturally ſandy. 3. *Red Urns* of fine Clay, with little or no Sand in it. Theſe Pots are quite throughout of a red Colour like fine *Bole*. Alſo many of theſe red Pots are elegantly adorned with Figures in *Baſſo Relievo*, and uſually the *Workman*'s *Name*, which I think others have miſtaken for the *Perſon*'s *Name buried there*, upon the Bottom or Cover, as *Januarius*, and ſuch-like; but that very Name I have

Roman Urns *and other* Antiquities *near* York; *by Dr.* M. Liſter. *Ph. Col. n.* 4. *p.* 87.

Burton's *C. Ant. It. p.* 183. 230.

ſeen upon ſeveral *Red Pots*, found both here and at *Aldborough*. After all, theſe are glazed, Inſide and Outſide, with a kind of Varniſh of a bright Coral Colour.

The Compoſition of the firſt Sort of Pots did firſt give me Occaſion to diſcover the Places where they were made; the one about the Midway betwixt *Wilberfoſſe* and *Barnby on the More*, 6 Miles from *York*, in the Sand Hills, or Riſing Ground, where now the Warren is. The other *Roman Pottery* on the Sand-Hills at *Santon*, not far off *Brigg* in *Lincolnſhire*. In the firſt Place, I have found widely up and down broken Pieces of *Urns*, *Slagg*, and *Cinders*. At the latter Place there are yet remaining (though it is a moveable Sand, and hurried every Way by the Wind, and has by that Means covered the Place all over) ſome of the very *Furnaces*, whoſe Ruins I take to be ſome of thoſe *Metæ*, or ſandy Hillocks. Beſides, here are many Pieces of *Pots* and *Urns* of different Shapes, and much *Slagg* and *Cinders*; this *Pottery* having taken up much Ground, as to one that ſhall diligently view the Place, it will appear. It is remarkable, that both the above-mentioned *Potteries* are within leſs than a Mile of the *Roman-Road*, or *Military High-Way*. I could not learn at either of thoſe Places where any Clay for that Purpoſe was to be had near thoſe Sands, which yet our *modern Potteries* chiefly ſeek after, which has made them to be forgotten and diſuſed.

The *Roman Urns*, above-deſcribed, differ in theſe Particulars from what Pots are now uſually made amongſt us. 1. That they are without all manner of *Glazing* with *Lead*, which perhaps is a modern Invention. 2. That a far greater Quantity of Sand is uſed than Clay, which Thing alone made it worth their while to bring their Clay to the Sand-Hills. 3. That they were baked either with more Leiſure, after long and thorough drying, or incloſed within certain Coffins, to defend them from the immoderate Contact of the Flames; which I am induced to believe, becauſe there ſeem to be Fragments of ſuch Things to be found. It is certain the natural Colour of the Clay is not altered by burning; ſo that both the Degrees of Heat and Manner of Burning might be different. And one of theſe Potſherds, as I have heard, baked over again in our *Ovens*, will become *red*. As to the two laſt Kind of *Urns*, it is likely the firſt of them, with their Particles of *Mica* in it, were made of a ſandy blue Clay, of which Nature there is Plenty among the Weſtern Mountains of *Yorkſhire*, and particularly at *Carleton*, not far off *Ickly*, a *Roman Station*. The *red Urns* ſeem to have been their Maſter-piece, wherein they ſhewed the greateſt Art, and ſeemed to glory moſt, and to eternize their Names on them. I have ſeen great Varieties of emboſſed Work on them. And laſtly, for the elegant Manner of *Glazing*, it was far neater indeed, and more durable than our modern Way of *Leading*, which is apt to crack and craſe both with Wet and Heat; and at the Fire is certainly unwholſome, by reaſon of the Fumes *Lead* uſually emits, being a quick vaporable Metal. This antient *Glazing* ſeems to have been done by the Bruſh, or Dipping; for both Inſide as well as Outſide of the *Urn* are *glazed*, and that before the Baking. And *Lib.* 36. *c.* 19. ſomething of the Materials of it ſeems to be remembred by *Pliny*, *Fictili-*

lia ex Bitumine inſcripta non delentur; *The Painting of Pots with Bitumen is indelible.* And again, *Tingi ſolidas ex Bitumine Statuas*; *The Bitumen*, he ſays, *ſinks into the very Stones and Pots*, which is ſomthing more than *Glazing.*

Lib. 35. c. 15.

The great Plenty of theſe *Urns*, found in many Parts of *England*, ſeems to argue them alſo of *Engliſh* Manufacture; but where I cannot gueſs, unleſs wrought at the *Bole-Mines*, of which Clay alone they ſeem to be made, in *Cleveland*; for that the barren Tract of Land called *Black-Moor*, was well known to the *Romans*, the *Jet*-Rings taken up with theſe *Urns* do ſufficiently teſtify. Now *Jet* and *Bole* are no-where, that I know of, to be found with us in *England* but in that Tract, being Foſſils peculiar to thoſe Mountains. Of theſe *Jet*-Rings ſome are plain, and others wrought, but all of them of an extraordinary Bigneſs, being, at leaſt, three Inches Diameter, yet the inward Bore is not above an Inch and an half, which makes them too little for the Wriſts of any Man, as they are much too big for the Fingers; ſo that probably they were never worn either as *Armillæ* or *Annuli.*

Being upon this Subject of *Roman Clay-work*, we cannot but take Notice of the Opinion of *Camden*, who will have the *Obelisks* at *Burrow-Briggs*, in this County, *artificial*, when in Truth they are nothing leſs, being made of one of the moſt common Sorts of Stone, *viz.* of a coarſe Rag, or Milſtone-grit; but without doubt, the Bigneſs of the Stone ſurprized him, either not thinking them portable, or perhaps not any *Engliſh* Rock fit to yield natural Stones of that Magnitude: But *Roman Monuments*, I ſuppoſe, none does doubt them, becauſe pitched here by a very remarkable and known *Roman Station*, *Iſurium*. And then conſider what Trifles theſe are, compared with the leaſt *Obelisks* at *Rome*. And as to the Rocks whence they might be hewn, there are many of that Stone near the River *Nid*, and upon the Foreſt of *Knarſbourg*; and a little above *Ickley* (another *Roman Station*) within 16 Miles of *Burrow-Briggs* there is one ſolid Bed of this very Stone, whoſe perpendicular Depth only will yield *Obelisks* at leaſt 30 Foot long. And yet at *Rudſtone*, near *Burlington*, in the *Yorkſhire Woolds*, full 40 Miles wide of theſe Quarries, is an *Obelisk* of the very ſame Stone, Shape and Magnitude of theſe before-mentioned.

The Obelisks *at* Burrow-Briggs *not artificial, but natural Stones.* Ib. *p.* 90.

But we cannot let this paſs without noting, that almoſt all the *Monuments* of the *Romans* with us were of this Sort of Stone; as the antient Walls of this City, as appears by what remains of the antient Gates, and the great Quantities of it that are wrought up in moſt of the Churches, and are ſtill daily dug out of Foundations: But a moſt undeniable Inſtance is, a vaſt *Roman Head*, perhaps of ſome of the *Emperors*, upon a Neck or ſquare Pedeſtal of one ſolid Stone, with the Point of the Square to the Eye, of as coarſe a Grit as that of the *Obelisks* above-mentioned. This Stone is now in Mr. *Hilliar*'s Garden, and was dug out of the Foundations of ſome Houſes thereabouts. The only remaining *Inſcription* that I could find at *Burrow-Briggs*, yet imperfect as well as odd, is upon this Sort of Stone in the Street-Wall of Sir *William Tanker*'s Houſe. Alſo two *Roman Altars* I have ſeen of this Stone; one the Original of that at *Ickley* mentioned in

Other Roman Antiquities. *Ib.*

Fig. 4.

Vid. Vol. II. Cap. III.

Fig. 5.

Camden; another in the Poſſeſſion of that learned Antiquary Mr. *Thoresby*, late of *Leeds*. And this I think ſufficient to diſprove that Miſtake of *Camden*, that the Stones of *Burrow-Briggs* are *artificial*. There is but one only Inſtance that I ever yet met with of the *Romans* ever having uſed in theſe Parts of *England* any other Sort of Stone; yet it is not the common Lime-ſtone, but a certain Sort of Stone had from the Quarries about *Malton*, becauſe of the *Lapides Judaici*, by me formerly deſcribed to be ſeen in the Texture of it. It is a ſmall, but elegant Altar with Figures, in *Baſſo Relievo*, of ſacrificing Inſtruments, &c. It has ſuffered an unlucky Accident by the ſtupid Ignorance of the Maſons, who were ordered, by the late Lord *Fairfax*, to place it upon a Pedeſtal in the Court of his Houſe at *York*; yet the Inſcription was, by Chance, preſerved.

n. 145. *p.* 73.

I have alſo met with a large Pedeſtal of the ſame coarſe *Rag*, found deep in the Ground on the Weſt-ſide of the River; which by the Stone and its Mouldings was undoubtedly *Roman*, and muſt have been for a Pillar in ſome large Building.

Fig. 6.

There is a broken *Inſcription* in the Church-Wall in *All-Saints, North-ſtreet*, with the Figure of a naked Woman in *Baſſo Relievo* on the Left-ſide of it. The Letters (as many of them as remain) are exceeding fairly cut; beyond any thing I have yet ſeen of *Roman Antiquities* in *England*, and the Stone is of a finer Grain than ordinary. It is a Monument of *conjugal Affection*. The firſt Stroke is the Out-ſide of a great M, and is Part of the *Dis Manibus*. The three laſt Lines may be read thus, *Benè merenti Antonio Conjugi*; yet it is hard to ſay, whether it was for the *Husband* or *Wife*, for it may be read *Antoniæ*. The Points alſo betwixt the Words are here very ſingular; but this was the Caprice of the *Stone-Cutter*, who ſometimes alſo uſes a Leaf, hanging or erect, a Hand, a Feather, or ſuch odd Fancy, for *Points*.

A Roman Pottery *near* Leeds; *by Mr.* Ralph Thoresby. *n.* 222. *p.* 319.

X. I have lately diſcovered a *Roman Pottery* upon *Blackmore*, about two Miles from *Leeds* (the old *Leageolium*) the Name, *Hawcaſter Rigg*, gave me the firſt Occaſion to hope for ſome *Roman Ruins* there; but inſtead of the Remains of a *regular Camp* or *Fortification*, I was ſurprized to find ſeveral Rounds, or circular Heaps of *Rubbiſh*, abundantly too ſmall for any *military* Uſe: One by the Wheel was 16 *Perches* round; another in Walking, 76 *Paces*; and theſe I take to be the Ruins of ſome of the very *Furnaces*. It is a ſandy Ground, yet Plenty of *Clay* at no great Diſtance. The Country People tell me of Heaps of *Slagg* and *Cinders*, but I had not the Hap to meet with any, the Place being grown over with Moſs, &c. I am ready to fancy theſe might be for their *Bricks*, becauſe of the great Plenty of *Clay* in the Neighbourhood, and the great Number of thoſe *Roman Bricks*, yet to be ſeen in the Ruins of *Kirkſtal-Abbey*: And that it belonged to the *Romans*, I conclude, becauſe it is ſeated upon a Branch of the *Roman* Way, or one of their *Viæ Vicinales*, that leads from the great *military* Road upon *Bramham-Moor*, by *Thorner*, *Shadwell*, and *Kirkſtall*, to *Cambodunum*. Beſides, the very Name ſeems to import ſome *Roman*

Caſtrum near the adjoining Eminency that the *Saxons* called *Haws* or *Houghs*; and the Word is yet retained in ſome Parts of *Yorkſhire*, witneſs *Hamleton-Hough* in the Road to *Selby*. And to conclude, the Village that ſucceeded the *old Pottery*, is called *Potter-Newton*.

XI. *Vitruvius* tells us, that the *Romans* antiently let their *Bricks* ſtand to dry a whole Year, ſometimes longer, before they were burnt; and it is obſervable, that thoſe ſtupendous *Remains* of that antient *Amphitheatre* of *Roman* Work being all Bricks near *Bourdeaux*, are ſtill as firm as a Rock, excepting ſuch Places as the Rains and Storms have ſpoiled, by getting in at Top: Which may alſo be ſeen in divers other old Structures in *Italy*, *France* and elſewhere.

The Excellency of Roman Bricks *and* Plaſtering; *by* . . . *n.* 93. *p.* 6010.

Their *Plaſtering* alſo to this Day, where it hath not met with violent knocking or breaking, is to be ſeen as free from Cracks or Crevices, and as ſmooth and poliſhed, as if it were Marble; witneſs their *Aqueducts*, whoſe Bottom and Sides were thus *plaſtered*; and particularly that, whereof ſome Yards are ſtill to be found on the Top of *Pont de Gare* near *Niſmes*, for the Support of which that famous *Bridge* was built to carry Water to the ſaid Town.

XII. An old earthen Veſſel was lately found at the Brick-kilns without *Bowthant-Bar*, near *York*; and is preſerved in the *Muſeum Aſhmoleanum* at *Oxford*. It is ſuppoſed by ſome to be an *Urn*, by others to be a *Flower-Pot*. The *Clay* is of the Colour of *Halifax-Clay* when burnt; the *Potter*'s Part is well performed, the *Face* being boſſed from within with the Finger, when upon the *Wheel*; and ſome Strokes of *red Paint* about the Curls of the Hair and Eye-brows; and two *red* Threads about the Neck. On the Back-ſide of the Veſſel, a *Leaf* is drawn in *red*, which is ſtill very freſh; but no *Glazing*, neither upon the *Clay* nor *red Colour*: The *Face* upon the Veſſel is as large as that of middle-ſized Women.

An old Earthen Veſſel *found near* York; *by* ... *n.* 171. *p.* 1017.

XIII. Carefully viewing the *Antiquities* of *York*, the Dwelling of at leaſt *two* of the *Roman Emperors*, *Severus* and *Conſtantine*, I found a Part of a *Wall* yet ſtanding, which is undoubtedly of that Time; it is the South Wall of the *Mint-Yard*, being formerly an Hoſpital of *St. Laurence*, looking towards the River: It conſiſts of a *Multangular Tower*, which did lead to *Bowthant-Bar*, and about . . . . . . Yards of a *Wall*, which ran the Length of *Coning-ſtreet*, as he who ſhall attentively view it on both Sides may diſcern.

A Roman Wall *and* multangular Tower *at* York; *by* Dr. M. Liſter, *n.* 149. *p.* 238.

The Outſide, towards the River, is faced with a very ſmall *Saxum Quadratum* of about 4 *Inches* thick, and laid in Levels like our *modern Brick-work*; but the Length of the Stones is not obſerved, but are as they fell out in hewing. From the Foundation 20 *Courſes* of this ſmall *ſquared-Stone* are laid, and over them 5 *Courſes* of *Roman Brick*: Theſe *Bricks* are laid, ſome length-ways, and ſome end-ways in the *Wall*, and were called *Lateres Diatoni*. After theſe 5 *Courſes* of *Brick*, other 22 *Courſes* of ſmall *ſquare*

Stone (as before deſcribed) are laid, which raiſe the Wall : : : : Feet higher; and then 5 more *Courſes* of the ſame *Roman Bricks* are overlaid, beyond which the *Wall* is imperfect, and cap'd with *modern* Building. Note, That in all this Height there is no *Caſement* or *Loop-hole*, but one intire and uniform Wall, from which we gueſs the *Wall* to have been built ſome Courſes higher after the ſame Order. The *Bricks* were to be as *Thoroughs*, or as it were, ſo many new Foundations to that which was to be ſuperſtructed, and to bind the two Sides together firmly; for the *Wall* itſelf is only faced with ſmall ſquare Stone, and the Middle thereof filled with Morter and Pebble.

Vitruvius commends *Brick-Building* before *Stone*, even for the Duration; and therefore to excuſe it, he gives a Reaſon why the *Romans* ſuffered not *Brick-Buildings* to be made within the City of *Rome*, as a Thing not of Choice, but Neceſſity. The *Law* (ſays he) ſuffers not a *Wall* to be made to the *Streetward* (for ſo give me Leave to interpret *communi Loco*) above a Foot and a half thick, and *Partition-Walls* the ſame, leſt they ſhould take up too much Room. Now *Brick-Walls* of a Foot and a half thick (unleſs they were *Diplinthii* or *Triplinthii*) cannot bear up above one Story. And therefore, when a plain *Area*, or Building of one Story, could not receive ſuch a Multitude to dwell in the City, the Houſes of Neceſſity were raiſed higher, and they had ſtrange Contrivances of out-jetting and over-hanging Stories, and *Balconies*, *&c.* Which Reaſons, if rightly conſidered, are great Miſtakes: Our Men at this Day have demonſtrated that a firm Building may be raiſed to many Stories Height upon a Foot and a half thick Wall. The Overſight of the *Romans* was the vaſt Bigneſs of their *Brick*; for the leſſer the *Brick*, the firmer the Work; there being much greater Firmneſs in ſuch a vaſt Multitude of Angles, as muſt be produced by a *ſmall Brick*, than in a right Line; and this is the Reaſon of the Strength of *Buttreſſes*, and *Multangular Towers*, &c.

Thoſe *Bricks* are about 17 *Inches* of our Meaſure long, and about 11 *Inches* broad, and 2 *Inches* and a *half* thick. This (having cauſed ſeveral of them to be carefully meaſured) I give in round Numbers, and do find them to agree very well with the Notion of the *Roman Foot*, which the learned Antiquary *Greaves* has left us; *viz.* of its being about *half an Inch leſs than ours*. They ſeem to have ſhrunk in the baking more in the Breadth than in the Length; which is but reaſonable, becauſe of its eaſier yielding that Way; and ſo for the ſame Reaſon, more in Thickneſs; for we ſuppoſe them to have been deſigned in the *Mould* for 3 *Roman Inches*. This demonſtrates *Pliny*'s Meaſures to be true, where he ſays, *Genera Laterum tria*; Didoron, *quo utimur*, *longum* Seſquipede, *Latum Pede*; and not thoſe of *Vitruvius*, as they are extant; the Copy of *Vitruvius*, where it deſcribes the Meaſures of the *Didoron*, being vicious. And, indeed, all that I have yet ſeen with us in *England* are of *Pliny*'s Meaſures; as at *Leiceſter*, in the *Roman Ruin* there, called the *Jews Wall*; and at *St. Albans*, as I remember, as well as here with us at *York*: So that the *ſingle Brick-Wall* was only allowed as Standard, *viz.* a Foot and a half thick Wall, or one *Roman*

Brick a Length. And therefore it is but reaſonable we ſhould make *Vitruvius*'s *Longum Pede, Latum Semipede*, a Fault of *Vitruvius*'s Coppiers.

I ſhall only add this Remark, That *Proportion*, and a plain *Uniformity*, even in the minuteſt Parts of Building, is to be obſerved; as this miſerable *Ruin* of *Roman Workmanſhip* ſhews. In our *Gothick Buildings* there is a total Neglect of the Meaſure, and Proportion of the *Courſes*; as though that was not much material to the *Beauty* of the whole; whereas indeed in Nature's Works it is from the *Symmetry* of the very Grain, whence ariſes much of the Beauty.

Several Roman Antiquities *about* York *and* Leeds; *by Mr.* Thoresby, *n.* 234. *p.* 738.

XIV. I have added to my *Roman Curioſities* two intire *Urns*, both of the *bluiſh Grey Clay*, but of different Forms, with ſome of the burnt Bones, and two other Veſſels of *Red Clay:* The leſſer of them is almoſt in the Form of the *Roman Simpulum*, or *Guttus*, and by the Narrowneſs of the Neck ſeems rather to have been a kind of *Lacrymatory*, or Veſſel for ſome kind of *liquid* Matter, rather than *Aſhes*; the other was Part of an *Aqueduct*, and is turned in the Form of a *Screw* on the Inſide, and has a narrow Neck at one End, to put into the open End of the next; and ſeveral of theſe (each a Foot long and 4 Inches broad) were found thus placed in the *Roman Burying-Place* at *York*, by the River-ſide, out of *Boutham-Bar*, which our learned Dean, Dr. *Gale*, tells me ſignifies *Burning* in the *Britiſh Language*, and it was indiſputably the Place the *Romans* made uſe of to that End, as appears by the great Number of *Urns* there frequently found, when they dig the *Clay* for *Bricks*. And that it continued the Place of their *Sepulture* after that Cuſtom of *Burning*, introduced in the tyrannous Dictatorſhip of *Sylla*, was aboliſhed, is evident by a remarkable *Hypogæum* without any *Urns* in it, diſcovered the laſt Winter 1696; it was large enough to contain two or three *Corpſes*, and was paved with Bricks nigh two Inches thick, eight in Breadth and Length, being equilaterally ſquare, upon which was a ſecond *Pavement* of the ſame *Roman* Bricks to cover the Seams of the lower, and prevent the working up of Vermin: But thoſe that covered the *Vault* were the moſt remarkable that ever I ſaw, being about two Foot ſquare, and of a proportionable Thickneſs. I have alſo a third Sort of *Roman* Bricks, which I diſcovered in the Ruins of *Kirkſtal-Abbey*, two Miles from *Leeds*, which come the nigheſt thoſe mentioned by *Vitruvius*, being 8 Inches broad, and almoſt double the Length. I have alſo two Sorts of *chequer'd Pavements*, one of about 3 Inches ſquare, the other (of thoſe found at *Aldborough*) not above half, or one 4th of an Inch, and of *different Colours*.

A Roman Coffin, *and other* Roman Antiquities *and* Coins; *by Mr.* Ralph Thoresby. *n.* 244. *p.* 310.

XV. I have procured Part of the *Bottom* (which conſiſted of ſeveral ſuch Pieces for the Conveniency of *Baking*) of an old *Roman Coffin* that was lately dug up in their *Burying-Place* out of *Boutham-Bar* at *York*. It is of the *Red Clay*, but not ſo fine as the *Urns*, having a greater Quantity of coarſe Sand wrought in with the Clay. As to the Form (which is intire as it was at firſt *moulded*) it is 14 Inches and a half long, and about 11 broad,

broad at the narrower End, and nigh 12 and a half at the broader. This was the loweſt Part for the Feet, and the reſt were proportionably broader till it came to the Shoulders: It is an Inch thick beſides the Ledges; which are one broad and two thick, and extend from the Bottom of either Side to within 3 Inches of the Top, where it is wholly flat, and ſomewhat thinner, for the next to lie upon it; which ſeveral Parts were thus joined together by ſome Pin, I preſume; for at the End of each Tile is a Hole that would receive a common *Slate-Pin.* Theſe Edges are wrought a little hollow, to receive the Sides, I ſuppoſe; and at the Feet are two contrary Notches, to faſten the End-Piece. This Bottom I ſhould conclude to have conſiſted ſtrictly of 8 ſuch Parts, from a like Character 8 impreſſed upon the *Clay* by the *Sandapilarius*'s Finger before its *baking*, but that I ſomewhat doubt whether Numeral Figures be of that Antiquity in theſe *European* Parts. I got alſo ſome Scars of broken *Urns*, dug up in Mr. *Giles*'s Garden, which are of the fineſt *Clay* I have ſeen; with which was found a *Roman Shuttle*, about 3 Inches and a half long, but not *one* broad in the very Middle: The Hollow for the *Licium* being but one 4th of an Inch in the broadeſt Place, ſhews that it was either for Silk or very fine Linnen, perhaps their *Aſbeſtinum* or *incombuſtible Winding-Sheets.* I have alſo lately procured a *Roman Pottle* from *Aldbrough*, which is of the red *Clay*, but much coarſer than the *York Urns:* I take it to be ſtrictly the half of their *Congius*, and comes the nigheſt Mr. *Greaves*'s Computation, containing 3 Pints and a half, the *Wincheſter Meaſure.*

Vid. *Sup. Vol.* I. *Cap.* I. *Sect.* XXVII.

I have received 22 old *Roman Coins* from Mr. *Townly* of *Townly*, which were lately found in the Pariſh of *Burnley* in *Lancaſhire.* Many of them are *Conſular*, or *Family Coins*, one of them, *viz.* *Q. Caſſius*, was 162 Years *ante Chriſtum*, according to *Goltzius*'s Method, being ſtrictly the ſame he places *A. U. C.* 589. That they were the antient *Roman Denarii*, and coined before the Emperors Times (notwithſtanding the contrary Sentiments of ſome learned Men) I think is evident, becauſe there is moſtly, inſtead of the Emperor's Head, the antique Form of the *Caput Urbis*, without Inſcription: Beſides, *Tacitus* calls theſe *Bigati* and *Quadrigati*, *Pecuniam Veterem ac diu notam.* Again, others have upon them ROMA, which I find not uſed by any of the Emperors (except thoſe ſmall Pieces upon the Tranſlation of the Empire to *Conſtantinople*) Again, the Letters in theſe are often interwoven, as particularly V—L, in one I have of *L. Valerius Flaccus. A. U. C.* CDXCII, which, according to *Goltzius*, is the 7th Year after the *Romans* firſt ſtamp'd Silver Monies: And to mention no more, many are of the *Serrato*'s filed in ſmall Notches round the Edge, of which Sort I have ſome of *Scipio Aſiaticus*, &c. and other *Conſular* Pieces; but I never ſaw any of a later Date.

A Roman Pavement *near* Roxby *in* Lincolnſhire; *by Mr.* Abr. de la Pryme, *n.* 263. *p.* 565.

XVI. *Aug.* 1, 1700, I went with Mr. *Place* and Mr. *Nevil* of *Winterton* to *Roxby* (a little Town on the Weſt of the famous *Roman Way* which runs from *Lincoln* to the *Humber* Side) to view a *Roman Pavement* lately diſcovered there by one *Tho. Smith*, as he was digging to repair a Fence.

The Cloſe or Garth, where this Piece of *Antiquity* is found, is in the Town on the South-Weſt of the Church. We bar'd about a Yard and half Square; in doing which we caſt up many Pieces of *Roman Tile*, the *Bone* of an hinder Leg of an Ox or Cow, broken in two, and many Pieces of *Plaſter* painted *Red* and *Yellow*, which ſeemed to have been the *Corniſh* at the Foot of ſome *Altar*, or elſe perhaps of ſome Part of the *Building*; and we obſerved that ſeveral great Stones, in their falling (when the Building over this *Pavement* was deſtroyed) had broken and lodged themſelves in the *Pavement*, and there lay until we removed them. The *Pavement* itſelf looked exceeding *beautiful* and *pretty*; and yet the *Stones* which compoſed it were nothing but ſmall four-ſquare Bits of *Brick*, *Slate* and *Cauk*, ſet in curious *Figures* and *Order*, and are only of 3 Colours, *Red*, *Blue*, and *White*. The Material that theſe ſmall *Stones* is ſet in, is a Floor of *Lime* and *Sand*, and not *Plaſter*. The whole *Pavement* conſiſts of *Circles*, and *quadrangular*, and many uneven *Figures*, with *Rows* of the aforeſaid *Stones*; in ſome of which *Circles* and *Figures* were *Urns*; in others *Flowers*; in others interchangeable *Knots*, according as the Workman pleaſed.

A Roman Altar; *by Dr.* M. Liſter; *n.* 145. *p.* 70.

XVII. I have got into my Hands a very large and fair *Roman Altar* of one intire Stone, which was but a very few Years ago diſcovered upon the South Bank of the River *Tine*, near *Shields*, in the *Biſhoprick* of *Durham*. The Stone itſelf is of a coarſe *Rag*, the ſame with that of the *Pymarids* at *Burrow-Briggs*. It is 4 *Foot* high, and was aſcended to by *Steps*, which appeareth in that all the Sides but the *Front* have two ſquare Holes near the Bottom, which let in the Irons that joined it to the *Steps*.

Fig. 7.

On the Backſide, oppoſite to the *Inſcription*, is engraven in *Baſs-Relievo* a *Flower-Pot* furniſhed, I ſuppoſe with what pleaſed the Stone-cutter; for theſe Men needed not to be more curious than the Prieſts themſelves, who were wont to make uſe of Herbs next Hand to adorn the *Altars*; and therefore *Verbenæ* is put for any kind of Herb: Yet if we will have it reſemble any thing with us, I think it moſt like, if not truly, *Nymphæa*, a known and common River-Plant. *Fig.* 8. On one of the Sides, which is ſomewhat narrower than the Front or Back, are engraven in *Baſs-Relievo*, the *Cutting-Knife* (*Ceſeſpita*) and the *Ax* (*Securis*). The *Knife* is exactly the ſame with that on the other *Altar* mentioned above: But the *Ax* is different; Vid. *Sup. Sect.* IX. for here it is headed with a long and crooked Point, and there the Head of the *Ax* is divided into 3 Points. *Fig.* 9. On the other Side are engraven, after the ſame Manner, an *Eure* (*Urceolus*) and a *Ladle*, which ſerve for a *Sympullum*. This I call rather a *Ladle* than a *Mallet*, it being perfectly *Diſhwiſe* and hollow in the Middle; although *Camden* is of another Opinion in that elegant Sculpt of the *Cumberland-Altar*. And the very ſame *Utenſil* I have ſeen and noted on the *Ickley-Altar*, which is yet extant at *Middleton-Grange* near that Town. *Fig.* 10. The *Plane* of the Top is cut in the Figure of a *Baſon* (*Diſcus* or *Lanx*) with *Anſæ* on each Side, conſiſting of a Pair of *Links* of a *Chain*, which reſt upon, and fall over two Rowls; and this was the *Hearth*. *Fig.* 11. The *Front* hath an *Inſcription* of 9 *Lines* in *Roman*

Roman Letters, each *Letter* a very little more than two Inches deep of our Meaſure, now remaining as in the *Sculpture*, which I would read thus, *Dis Deabuſque Matribus pro Salute M. Anrelii Autonini Auguſti Imperatoris— Votum Solvit lubens merito ob Reditum.*

The *Deæ Matres* are well interpreted by *Selden*. It is much his Safety and Return, both vowed, ſhould be ſo ſeparated in the *Inſcription. Caracalla*, ſay the Hiſtorians, after his *Father's Death at York*, took upon him the Command of the Army *alone*, and the whole Empire; he went *alone* againſt the Enemy, who were the *Caledonii* inhabiting beyond the *Wall* which his *Father* had built. He made Peace with them, received their Hoſtages, ſlighted their fortified Places, and returned. And this ſeems to be confirmed by the *Inſcription*; for undoubtedly upon this laſt Expedition of him *alone*, without his Brother *Geta* and *Mother*, was this *Altar* erećted to him *alone*, at a Place about two *Stations* on this Side the *Wall*. So that the Vow might be as well underſtood of his Return from this *Expedition*, as for his *Safety* and *Return* to *Rome*; which methinks ſhould be true, or his Mother and Brother *Geta* would ſcarce have been left out, at leaſt ſo early: For yet the Army declared for them *both*, according to their *Father's Will*.

Further, it ſeems alſo to have been erećted by thoſe who flattered him, and who were afterwards killed by him; and for this Reaſon the Perſons Names who dedicated it, ſeem to me to be purpoſely defaced, the 6th and 7th *Lines* of the *Inſcription* being deſignedly cut away by the Hollowneſs of them, and there not being the leaſt Sign of any *Letter* remaining; and this, I ſuppoſe, might be part of their Diſgrace, as it was uſual to deface and break the *Statues* and *Monuments* of Perſons *executed*, of which this *Monſter* made ſtrange Havock.

There is another Reading of Part of the two *firſt Lines*, which I do not diſallow, but that it will agree well enough with the Hiſtory of *Severus*, though his *Apotheoſis*, or ſolemn *Deification*, was not performed till he came to *Rome*, in the Manner of which *Funeral Pomp Herodian* is very large; it was of that excellent Antiquary Dr. *Johnſon* of *Pomfret*. CONSERVATORI. B. PROS. &c. as it follows in mine: Which ſhews the Height of Flattery of thoſe Times. So that they paid their Vows to the lately *Dead Father*, the *Conſervator* of *Britain*, for the *Safety* of the *Son*; and the Story tells us how gladly he would have had him made a *God* long before, even with his own Hand.

Two Roman Altars *in* Northumberland; *by Mr.* Ralph Thoresby. *n.* 231. *p.* 663. *Fig.* 12.

XVIII. Dr. *Cay* of *Newcaſtle* has ſent me the Copies of two *Roman Altars*. The former of them was taken out of the *Roman Wall* not far from *Collerton*, or *Chollarton* *, and may tempt us to believe that the old *Procolitia*, which was the *Station* of the *Cohors prima Batavorum*, was rather *there*, which is an important Place (where the River *Tine* interrupting the Courſ

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† *Prope* Collerton Cilurnum. *Notitia Dignitatum Imperii*; *eſt tamen* Procolitia ali *Locus à* Cilurno.

Courſe of the *Wall*, it was but neceſſary that the *Ford* ſhould be ſecured by making one of the *Cohorts* keep that *Station*; and it is but 2 Miles and a half from *Carrow* where the *Altar* now is in the Poſſeſſion of Mr. *Forſter*:) than at *Pruddow*, which is at leaſt 10 Miles Diſtance from where Mr. *Camden* ſeemed to fancy it. The other is at *Blenkingſop* * *Caſtle* in *Northumberland*, which I take to have been dedicated by *Lucius Anius* to the *Goddeſſes Nymphs*, *old* and *young*, and particularly to the *Debonair* (if *Urbana* be taken appellatively) *Manſueta Claudia*; for thus I read it, DEABVS NYMPHIS *Veteribus* ET *Junioribus* MANSVETAE CLAVDIAE VRB*anæ*, *Nuncupavit Hoc Lucius Ann* IVS; and thereby the Defects in the Stone ſeem to be ſupplied with a right Number of Letters in each Vacuity.

Fig. 13.

* *Propè* Blenkenſhop & Widen, Vettii. *Circa hæc Loca* Fontes. *Utrumque Nomen hoc indicat.*

XIX. Dr. *Liſter*, in the *Year* 1683, exactly deſigned the *Roman Inſcriptions*, *Fig*. 14, 15, 16, 17, 18, 19, 20, according to the *Originals* now to be ſeen at *Bath* in *Somerſetſhire*. The Letters of *Fig*. 15, 16, 17. are 5 Inches complete.

Fig. 21. contains the *Inſcription* of an *Altar* found near the *Roman Camp*, which is placed within the Angle where the Two Rivers *Medloe* and *Erwin* meet, a little Mile S. W. of *Mancheſter* in *Lancaſhire*, and preſerved in the Garden of the Worſhipful *Edw. Moſeley de Holme*, *Armiger*.

Some Roman Inſcriptions; *by Dr*. M. Liſter. *n*. 155. *p*. 457.

Fig. 14, 15, 16, 17, 18, 19, 20.

Fig. 21.

XX. *Oct*. 26. 1698, I got a Sight of an *Altar-Piece*, dug up at *Cheſter* about Three Years ſince, and is now in the Cuſtody of one Mr. *Preſcot*.

The following *Inſcription* thereof is pretty intire, but roughly cut in the *Stone* of the Place †, which is ſoft and mouldering, nor capable of long Continuance when it is expoſed to the Air.

A Roman Altar *at* Cheſter; *by Mr.* Edmund Halley. *n*. 222. *p*. 316.

† *Vid. ſup.* Vol. II. *Cap*. III.

PRO SAL. DOMIN
. . . . IM NNINVI
CTISSIMORVM
AVGG. GENIO LOCI
FLAVIVS LONG___ *I ſuppoſe* VS, *there not being Room*
TRIB. MIL. LEG XX. *for* INVS.
LONGINVS FLA
VIVS DOMO
SAMOSATA
V. S.

By the Title of *Domini noſtri* given to the *Emperors*, it appears that this *Inſcription* was of the *Bas-Empire*, not before *Diocleſian*, nor yet ſo late as *Theodoſius*, it being *Pagan*. The *Stone* itſelf is about 32 *Inches* high, 16 in Breadth, and 9 thick; on the one End is engraven, not very curiouſly, the Reſemblance of a *Genius* holding a *Cornu Copiæ*; on the other is a *Flower-*

Flower-pot ſomewhat better performed, but a little endamaged by the Soft-neſs of the Stone. The Backſide, oppoſite to the *Inſcription*, is adorned with a pretty ſort of *Fuillage*, deſigned to fill up the vacant Space. On the Top, in a pretty deep Cavity, is a full Face of a Man, almoſt ſuch as they paint the *Sun* or *Full-Moon* withal, with a Cap upon his Head, of which as yet I cannot comprehend the Deſign.

Some Roman Inſcriptions *found near* Durham; *by Mr.* Chr. Hunter. *n.* 266. *p.* 657. *Fig.* 22.

XXI. Theſe *Inſcriptions* were found near to a Village called *Lancaſter*, about 5 *Miles* North-Weſt from *Durham*, which I am fully perſuaded has been the *Longovicum* of the *Romans*. This Place has been a very conſiderable Place in theſe Parts, and their *Watling-ſtreet* lies through it. It is on the Top of a Hill, which has a Deſcent on three Sides; towards the Weſt it is over-looked by a high Hill, and almoſt Eaſtward from it, about a Quarter of a Mile, ſtands the preſent *Lanchester*, a tolerable Country Village, with a pretty Church, which before the *Reformation* was endowed with a *Deanery* and 6 *Prebends*. The Form of this Place has been ſquare, and fortified with a thick ſtrong Stone Wall faced with hewn Stone. Within the Wall are (and have been formerly) nothing but ruinous Heaps of Stones; as alſo without the Wall too, eſpecially towards the Eaſt. It is probable the Buildings within the Wall have been all publick, ſuch as the *Station* for the *Soldiers*, *Temples*, *Palaces*, &c. or (which I am more inclined to think) there has been nothing but the *Lodging* of the Gariſon within the Wall. This I rather ſuppoſe, becauſe the *Inſcription* of *Gordianus* was not found here, but about a hundred Yards from the Wall towards the Eaſt, near which Place the largeſt Stones are found; and I myſelf, above a Year ago, found Part of a large *earthen Urn* near this Place, within which I ſuppoſe there had been a leſſer: Such I remember was found at another Village not far from this, which I am perſuaded has been another *Colony*. There is no doubt but this *Colony* has been adorned with many beautiful *Palaces*, and other ſumptuous Buildings; and perhaps the *Balneum cum Baſilica*, mentioned in one of theſe *Inſcriptions*, has been that ſo long in vain ſought for at *Rome*.

Some Roman Coins; *by Mr.* Ralph Thoresby, *n.* 241. *p.* 208.

XXII. I have procured ſome of the *Roman Coins* lately plowed up about *Nottingham*; but they prove common, and moſt of *Tetricus*, though ſome alſo of *Gallienus*, *Victorius*, and *Claudius Gothicus*.

Molds for Coining *or* Counterfeiting Roman Money; *by Mr.* Thoreſby, *n.* 234. *p.* 739.

XXIII. Mr. *Clark* (the Lady *Camden*'s Lecturer at *Wakefield*) has brought me ſome very fair *Coins*, or rather *Impreſſions* upon *Clay*, which he reſcued from ſome Labourers, who in delving in the Fields near *Thorp on the Hill*, found a conſiderable Number of them. At firſt we could not imagine for what Uſe they were deſigned; but upon a ſtricter View it appears plainly, they were for the *coining*, or rather *counterfeiting* of the *Roman* Moneys, that wretched Art it ſeems being in Vogue 1500 Years ago, for they are indiſputably of that Antiquity, and are really very dexterouſly done. They have round the *Impreſſion* a Rim about half the Thickneſs of the *Roman*

Silver Penny, in each of which is a little Notch, which being joined to the like Nick in the next, makes a round Orifice to pour in the Metal. Each of theſe has either two *Heads*, or as many *Reverſes*; ſo that placing one, for Example, with *Alexander Severus*'s *Head* on one Side, and his Mother *Julia Mammaea*'s on the other, betwixt two Pieces with *Reverſes*, it completes both; ſo that one with *Heads*, and another with *Reverſes*, are placed *alternatim* for a conſiderable Length, and then all paſted over with an outer Coat of *Clay* to keep the Metal from running out, and a little Ledge on either Side the Orifice, to convey the Metal into the long Row of Holes. They are all of *Emperors* about the ſame Age, when indeed the *Roman Moneys* were notoriouſly adulterated, as is obſervable in any Collection of their *Coins*, though ſome of them now are ſo ſcarce, particularly a *Duodumenianus*, that I queſtion whether this Age can produce one to take a Copy of.

A Roman Shield; *by Mr.* Thoreſby, *n.* 241. *p.* 205. *Fig.* 23.

XXIV. The antient *Romans* had three Words, *Scutum*, *Parma*, and *Clypeus*, for that defenſive Weapon we generally *Engliſh* a *Shield*; which notwithſtanding their different Forms or Matter, their Authors (eſpecially in the Declenſion of the *Empire*) frequently confound, as, if I miſtake not, we do *Shield*, *Buckler*, and *Target*. Of theſe *Shields* or *Bucklers*, I have one of the *Parma* kind, and rightly ſo called, *quod è medio in omnes partes ſit Par*; whereas the *Scutum* was moſtly *oval*, though ſometimes *Imbricatum*, with Corners equally broad. It is 15 *Inches* Diameter, whereof a little more than a 3d Part is taken up with the *Umbo*, or protuberant Boſs at the Navel, which is made of an even convex Plate, wrought hollow on the Inſide, to receive the *Gladiator*'s Hand: Upon the Centre of this is a leſſer Boſs, wherein there ſeems to have been fixed ſome kind of *Cuſpis*, or ſharp offenſive Weapon, to be uſed when they came to fight Hand to Hand; but the Form of this I cannot deſcribe, both my *Shields* being defective in that Point. From the ſaid *Umbo* the *Shield* is 4 *Inches* and a *half* broad on each Side, in which are 11 circular equidiſtant *Rows* of braſs *Studs* of that Size, that 222 are ſet in the utmoſt Circle, which is 4 *Foot* wanting 3 *Inches* (for that is the *Circumference* of the *Buckler*) and ſo proportionably in the leſſer Circles to the Centre of theſe 11 *Rows* of brazen *Studs*. The inmoſt Circle is placed upon the *Umbo* itſelf, the next 8 upon as many circular Plates of *Iron*, each a 3d of an *Inch* broad. The two outermoſt upon one thicker Plate, an *Inch* broad. In the little Intervals between theſe circular Plates are plainly diſcovered certain *craſs Laminæ*, that paſs on the Back of the other, from the *Umbo* to the exterior Circle; and theſe *Iron* Plates are alſo about the 3d part of an *Inch* at the broader End towards the Circumference, but gradually contracted into a narrower Breadth, that they may be brought into the Compaſs of the *Umbo* at the Centre. The inner Coat next to thoſe *Iron* Plates is made of very thick, hard, ſtrong *Leather*, which cuts bright, ſomewhat like Parchment. Upon that is a ſecond Cover of the ſame, and on the Outſide of this are plaited the *Iron Pins* that run through the *Braſs Studs*; for the above-mentioned *Braſs Studs* are caſt purely for

Ornament upon the Heads of the ſaid *Iron Pins*, the 6th part of an *Inch* long, that none of the *Iron* appears. The next Covert to the plaiting of the ſaid *Nails* (which paſs through the circular and croſs *Iron* Plates, and both the *Leather* Covers) is a pure Linen Cloth, but diſcoloured, though perhaps not with Age only, but ſour Wine and Salt, or ſome other Liquid wherein it ſeems to have been ſteeped. And laſtly, upon the ſaid Linen is the outmoſt Cover, which is of ſofter *Leather*. All which Coats, that compoſe the *Shield*, are bound together by two circular Plates of *Iron*, a thin and narrow one towards the Centre, and a thicker and large one, an *Inch* broad at the Circumference, which is curiouſly nailed with two Rows of very ſmall Tackets, above 400 in Number; the vacant Holes, whence ſome of the *Nails* are dropped out, are little bigger than to admit the Point of a Pair of ſmall Compaſſes; both which *Rims* do likewiſe faſten the *Handle* (the *only* Part of *Wood*) which has alſo 6 other *Iron Plates*, about 3 or 4 *Inches* long to ſecure it.

I lately procured another *Shield*, which differs from this not ſo much in *Size* (though it is completely a *Foot* larger in the Circumference) as in the *Form*: For whereas this already deſcribed is almoſt *flat*, except the ſwelling *Umbo*, this is abſolutely *concave*, and from the Skirts of the protuberant Boſs in the Middle, it riſes gradually to the Circumference, which is nigh 3 *Inches* perpendicular from the Centre. This has 14 *Rows* of the like Braſs *Studs*, but the *circular Plates* of *Iron* they are fixed in, do not lie upon other *croſs Plates*, as the former does, but each from the Centre upon the outer Edge of the other, which occaſions its riſing in that *concave* manner.

That theſe were part of the Accoutrement of the *Roman Equites*, rather than either the *Velites* or *Haſtati*, I conclude, becauſe that though all in general had *Shields*, yet thoſe of the *Velites*, who were as the *Forlorn Hopes*, ſeem more ſlight, and are expreſly ſaid to be, *è Ligno Corio ſuperinducto*; thoſe of the *Haſtati* are not only ſaid, *è pluribus Lignis & Aſſerculis conſtit.* &c. but were alſo 4 *Foot* long, to cover the whole Body, when ſtooping; of which kind were likewiſe thoſe of the *Principes* and *Triarii*. Whereas the Deſcription that the anonymous Author of *Roma Illuſtrata* with *Fabricius*'s Notes, gives in his *Armatura Equitum*, comes the nigheſt this, *Scutum ſive Parmam habebant ex Bovillo Corio, Arte leviter durata*; but then he adds, *eoque mero nulla Materia ſubjecta*, omitting not only the ornamental Studs, but the *Iron-Work* which *Camillus* firſt contrived as a Defence againſt the immenſe Swords of the *Gauls*.

The Roman Way *called* High-ſtreet *in* Lincolnſhire; *by Mr.* Abr. de la Pryme. *n.* 263. *p.* 561.

XXV. The *Roman Way* in *Lincolnſhire*, which is called all along by the Country People the *High-ſtreet*, runs (if I miſtake not) almoſt directly in a ſtrait Line from *Lincoln* to *Humberſide*. It is but ſlightly mentioned by Mr. *Camden*, as running (*ſays he*) from *Lincoln* Northwards into the little Village called *Spittle in the Street*, and ſomewhat further: I ſhall therefore continue its Courſe unto *Humber*. This *Street* is caſt up on both Sides with incredible Labour to a great Height, and diſcontinued in many Places, and then begun again. I obſerved, where it runs over nothing but bare Mould and plain *Heath*, that there it conſiſts of nothing but Earth caſt up; but where it comes to run through Woods, there it is not only raiſed with Earth, but alſo paved with great Stone, ſet Edge-way, very cloſe to one another, that the Roots of the Trees that had been cut down to make Way for the ſame, might not ſpring up again and blind the Road. Which paved Cauſeway is yet very ſtrong, firm, and viſible in many Places of this *Street*, where *Woods* are yet ſtanding on both Sides, as undoubtedly there were in the *Roman* Times, elſe it had not been paved; and in other Places it is *paved* where nothing of any *Wood* is now to be ſeen, though undoubtedly there was when it was made. In one Place I meaſured the Breadth of the ſaid *paved Street*, and found it juſt 7 *Yards* broad, *Engliſh* Meaſure.

This *Street* in its Courſe full North, as aforeſaid, runs by the Fields of *Hibberſtow* [which perhaps ſignifies the Place where the *Daniſh* General *Hubba* was buried] in which Fields, not far off this *Street*, is the Foundation of many *Roman Buildings* to be ſeen; as is manifeſt from their *Tile* there found: And Tradition ſays, that there hath been a City and Caſtle there, and there are two Springs, the one called *Julian*'s *Stony Well*, and the other *Caſtleton Well*; and there are ſeveral *old Roman Coins* now and-then found there. This might perhaps be ſome little old *Roman Town*, by their *Highway* Side, and was perhaps in after Times, before that it was ruined, called *Caſtletown*, or *Caſterton*, from its being built upon, or by ſome of their *Camps* that might then be in thoſe Fields. About a *Mile* further to the Northward on the Weſt-ſide of the ſaid *Street*, upon a great Plain or Sheep-walk, there are very viſible the *Foundations* of another *old Town*, though now there is neither Houſe, Stone, Rubbiſh, Tree, Hedge, Fence or Cloſe to be ſeen belonging thereto. I have counted the *Veſtigia* of the Buildings, and found them to amount to about *one hundred* that are yet viſible, and the Number of the *Streets* or Lanes are 4 or 5, and not far from it Northward is a Place called the *Kirk-Garth*, where the Church is ſuppoſed to have ſtood that belonged to this Town. Tradition calls this Place *Gainſtrop*, and I have read in the *Monaſt. Angl.* of Lands and Tenements herein given unto *Newſted Priory*, not far off this Place, in an Iſland in the River *Ank*, falſly called *Ankham*.

Vol. II.

About a *Mile* or two hence the *Street* runs through *Scawby Wood*, where it is all *paved*, and from thence cloſe by *Broughton* Town-End, by a Hill, which I ſhould take to be a *Barrow*, and that the Town had its Name from it, *quaſi Barrow-Town*, but that it ſeems to be too exceſſively great for one. However, I have found Fragments of *Roman Tiles* and *Bricks* there, which with its Situation ſo near this *Cauſeway*, make it ſeem to be of *Roman Original*. The *Retfords* were Lords of it ſeveral Ages, until that Sir *Henry Retford*, or *Radford*, Knight (with the *Earl* of *Rutland*, the Lord *Clifford*, the Lord *Clinton*, and others), about the Year 1455, loſt it by *Attainder* of *High-Treaſon*. One of which *Retfords*, called Sir *Henry*, but whether the foregoing or no, I cannot yet well tell, lay formerly in *Effigy* of white Marble all in Armour, with his Lady by him, in a ſmall Choir in the

Broughton.

n. 266. *p.* 677.

North Side of the Chancel of the Church of the ſaid Town; but was removed in the Memory of Man out of the ſame, and laid in an Arch within the Communion-Rails, and their Room and Place taken up to be the Burying-place of the worthy Family of the *Anderſons*, now Lords of the Manor (who are deſcended from Sir *Edm. Anderſon*, Knight, Lord Chief Juſtice of the *Common-Pleas*, in Queen *Elizabeth*'s Days, famous for his Uprightneſs and Love to the Church; whoſe Anceſtors lived at *Flixburrow* in this County) in which is the Effigies, to the Life, of Sir *Edmund Anderſon*, Baronet, moſt curiouſly cut in white Marble, lying upon a great *Altar-Tomb*, adorned with many *Arms* and *Inſcriptions*.

n. 263. *p.* 563. From thence the *Cauſeway* all along *paved*, is continued about a *Mile* further to the Entrance upon *Thornholm-moor*, where there is a Place by the *Street*, called *Bratton-Graves*; and a little Eaſt, by *Broughton Woodſide*, is a *Spring*, that I diſcovered ſome Years ago, that turns Moſs into *Stone*; and not far further ſtand the *Ruins* of the ſtately *Priory* of *Thornholm*, built by King *Stephen*. Oppoſite to this *Priory*, about a *quarter* of a *Mile* on the Weſt Side of the *Street*, is a Place called *Stanton*, from the *flying Sands* there, which have over-run and ruined above 100 *Acres* of Land. Amongſt theſe Sands was that great *Roman Pottery* mentioned by Dr. *Liſter*. I found there ſeveral *Roman Coins*, and Mr. *B.* of *A.* found a great Piece of Braſs in the Bottom of one of the *Furnaces* like a Croſs, which perhaps was Part of a *Grate* to ſet ſome Pots on while they were baking or drying. Returning back to the *Street*, there are ſeveral Sand-Hills, ſomewhat like *Barrows* thereby; on the Top of one of which was erected a great flat Stone, now ſo far ſunk in the Earth, that there is not above a Foot of it to be ſeen. Entering then into *Appleby-Lane*, the *Street* leads through the Weſt End of the Town, at which Town are two old *Roman Games* yet practiſed (though very imperfectly) the one called *Julian*'s *Bower*, and the other *Troy*'s *Walls*. From thence it runs ſtrait on, leaving *Roxby*, a little Town *half* a *Mile* on the Weſt, and *Winterton*, a pretty neat Town (where the worthy Families of the *Places* and *Nevils* inhabit), and then about 3 or 4 *Miles* further, leaving *Wintringham* about half a *Mile* to the Weſt, the ſaid *Street* falls into *Humber*, and there ends; at which End has been a Town called *Old Wintringham*, and a ſort of a Beach for Ships. All this End of the Country, on the Weſt Side of this *Street*, hath been full of *Romans* in old Time, as may be gathered from their *Moneys*, *Coins*, and the many *Tiles* and *Bricks* that are commonly here found, eſpecially at a Cliff called *Winterton-Cliff*, where have been ſome old *Roman Buildings*; and further, about 2 *Miles* more Weſtward is *Alkburrow*, which ſeems to have been a *Roman Town*, not only from its Name, but alſo from a ſmall Four-ſquare *Camp* or *Entrenchment* there, on the Weſt Side of which is a *Barrow*, called *Counteſs Barrow*, or *Counteſs Pit*, to this Day, ſunk hollow in the Middle.

Vid. Vol. II. *Cap.* III. *Sect.* XL. *vid. ſup. Sect.* IX.

A ſtrange Well, *and ſome* Antiquities *found at* Kirkbythore; *by Mr.* Tho. Machil, *n.* 158. *p.* 555.

XXVI. A *ſtrange Well* was lately diſcovered by the Foot of an Horſe, which ſtumbled upon it, in the common Road through *Kirkbythore* in *Weſtmorland*; it is about 10 Yards from the River *Troot-beck*, and as many from the great *Roman* Cauſeway, which leads to *Carliſle*, and goes betwixt it and a Place called the *Burwens*, being Part of the Ruins of *Whelp Caſtle* on the Eaſt Side of it: Perhaps the Caſtle-Walls have gone betwixt it and the River, and the Way run through it, as at *Maiden-Caſtle* on the Top of *Stane-moor*. It hath been covered with a Plank of Wood (I ſuppoſe of Oak) about 9 Inches thick, in the Faſhion of a Pot-lid; but decayed and macerated to the Colour and Conſiſtence of a *Peat*, or Turf; and above this was Gravel and Pavement about a Yard thick. Inſtead of *Walls* there were two large Wooden Veſſels, one upon another, like Hogſheads or Wine-pipes, with Bung-holes in them about 3 Inches Diameter; and the Plowings for the Heads were fair to be ſeen. They were made of *Fir* (whenceſoever they came) above an Inch thick; each of them in Depth, by a Perpendicular, 6 Foot at the leaſt; at the Heads in Diameter, 2 Foot 8 Inches; in the Middle, 3 Foot 5½ Inches. At the Bottom, about 5 Yards deep, were 4 Planks of Wood, laid Quadrangular-wiſe, ſupported with a Stone at every Corner, to bear up the Fabrick, and let in Water through the Gravel and Sand, which lay looſe in the Bottom about a Yard deeper. The Wood of the Veſſels and the Planks were *ſound* (though the Cover was *rotten*), becauſe not ſo much expoſed to the Air.

The Workmen flattered themſelves with the Hopes of ſome Treaſure, but they only found ſome old Earthen Veſſels, with Pieces of *Urns*, one Piece of a Drinking-Glaſs, and ſeveral *Sandals*. The Earthen Veſſels were of very fine Metal (if I may ſo call it) of a Brick-like Colour, and in ſeveral Forms; but the moſt (and moſt remarkable) were like a Baſon or Poſſet-Cup; the Bowl, Semiglobular; the Foot, a Ring: Some were in Diameter about 8 Inches, and in Depth on the Inſide more than 3½, ſome more, ſome leſs, as appear by the *Fragments* which came unto my Hand. They were, for the moſt part, very finely *imboſſed*; but 3 more eſpecially, *viz.* one with a *Vine-branch*, having a Figure in every Turning, and in the firſt Place a *naked Man* ſtanding alone upon the Left Foot, the other Leg croſs, and holding his Left Hand down towards his Back, his Right towards his Belly, with a Branch of Laurel of 3 Sprigs in it, one of which turns up to his Face-wards over the Crook or Bending of his Arm; and at his Feet is a Branch of Laurel, and a Bloſſom or Flower. In the next is a Vine-Leaf, 2 Bloſſoms at the Bottom, and at the Top 2 Peacocks regardant. In the next is a *Victory* (as I take it) *viz.* an Angel or *Genius*, holding in its Right Hand (the Arm ſtretched out, and the Face looking towards the Man) a Garland of Laurel; in the Left a Sprig of the ſame, and two Sprigs likewiſe are at the Foot with Flowers or Bloſſoms, and one Flower in the Middle betwixt the Garland and one of thoſe Sprigs. In the next is a Vine-Leaf, the ſame as before. In the next is *Victory*, and ſo by Turns till it ends with a Vine-Leaf next the Man; and upon it are alſo ſome *Goth-like* Characters of the leſſer Sort, but dim and obſcure. Another of theſe *Pots* is adorned with Circles and Semicircles; in one of theſe Circles is the Figure of a Man ſitting on a *Plinth* or ſquare Stone; in all the reſt are fluttering *Genii*. In ſome of the Semicircles are Lions and Goats (or ſome ſuch-like

Creatures) here one, and there another, all ſingle and current; and near the Bottom are *Stags* in Courſe, and *Greyhounds* purſuing, with an Inſcription (in a *Goth-like* Character of the *greater* Sort) which ſee *Fig.* 25. *Fig.* 25. This may be *Paulini*. An *Inſcription* with the like Characters is to be ſeen at *Burrow-Brig*, and publiſhed by Dr. *Liſter*. And they have been careful in preſerving theſe; for this and ſome other, having been broke, are crammed (or rather ſoldered) with Lead. The 3d Sort is yet far more beautiful than any of the reſt, being adorned with *Greyhounds* very well moulded, and in full Purſuit of *Stags* and *Hinds*, and the *Wild Boar*; upon which I diſcovered the ſame *Inſcription* as in the other. And though I am not ſo vain, as to ſay this relates to *our Coats* of *Arms*, yet having ſo near an Affinity with it, both in *Creſt* and *Charge* (*a*. the *Stag*'s *Head*; *b*. 3 *Greyhounds current*; *c*. *Whelp Caſtle*), and being found at the Place which we came from (as is ſaid and believed), I cannot but take ſome Notice of it. There were ſeveral other broken *Inſcriptions*, and one above the reſt upon the Bottom of a plain Diſh or Platter (on the Inſide of it) writ as in *Fig*. 26. *Fig.* 26. But whether it ſtands for *Veſpaſian Imperator*, or *Domitianus*, or neither of them, I cannot tell.

As to the Glaſs, there was but a very ſmall Fragment of it; I can ſcarce gueſs the Figure, but I think it a *Flute-Glaſs* made like a Tunnel or Spire inverſed: It hath been as thick as a Barley-Corn.

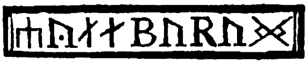
The *Urns* were of a leaden Colour, inclining to black; one had been large, 2 *Inches* thick in the Side of the Pot, but how big I know not, for there was a Sherd only brought to me. The Top was in Diameter, from Outſide to Outſide, 7 *Inches*, of which the *Roll* is 2 *Inches*, and the *Mouth* 3 *Inches*; the Neck yet ſtreighter, and only $\frac{1}{3}$ of an *Inch* thick. And many ſuch are found at this Town, ſome of which have *Ears* and *Handles* as thick as my Arm-wriſt, and their *Heads* and *Mouths* much of this Bigneſs, but thicker and ſtronger. But the other was almoſt intire and whole, though a very ſmall one; in Height $8\frac{1}{2}$ *Inches*, in Diameter $6\frac{1}{2}$, at the Mouth almoſt $3\frac{1}{2}$, and in the Neck more than $2\frac{1}{2}$. The Bottom well nigh as big as the Top, excepting the Ring; and the Body in Thickneſs the 5th Part of an *Inch*, but thicker ſomewhat at the Top and the Bottom.

Fig. 27. The *Sandals* were ſome for Men, ſome for Women, and ſome for Children, all ſhaped by their Feet, ſpreading more to the Outſide than to the Inſide; and ſome were very large, and ſome crooked, as *g*. The Leather was freſh of which they were made, but very tender when it came to be ſpread upon a *Laſt*. Each conſiſted of 3 principal Parts, an Upper-Leather (or rather Heel-piece, with two *Tabs* on each Side) an *Inner Soal*, *a*. long $11\frac{1}{2}$ *Inches*, broad $3\frac{3}{4}$; of 3 or 4 *Soals* ſtitched together with Leathern Thongs; and an *Outer Soal*, *b*. of 2, ſtuck full of Nails with little round Heads (ſo decayed and rotten, that I could ſcarce diſcern them to be Iron) plated on the Inſide: And to the Upper-Leather (threefold in the Heel-piece, *c*.) is fixed betwixt them, and ſowed with Leather, or rather tacked, which the Iron Nails do help to defend. Yet I think ſome *Womens* (of the better Sort) had no Nails at all, *d*. and of theſe there is one well worth the Obſerving, on, of *Spaniſh-like* Leather, and curious Workmanſhip, *f*, being exactly ſtitched down round about the *Fore-piece*, *long* 2½ *Inches*, with a pretty Label, *e*, of the ſame Piece hanging from it, for Faſhion-ſake ſurely; ſince it is too ſlender to be of any Uſe. As ſmall in the String as the 15th Part of an *Inch*. The *Tongue* at the End, broad *half* an *Inch*, long one *Inch*, betwixt the two Flouriſhes, which is the Length of the ſmall String, 8 Parts in 10 of an *Inch*; the two Flouriſhes take up the reſt. It is a long time ſince any *Sandals* were worn in this Country; and I am well informed that *theſe* are very different from the *Broagues* of *Ireland* and the *Highlands* in *Scotland*; for thoſe have but *one ſingle Soal*, and theſe have *ſix*.

XXVII. The *Runic Inſcription* at *Beaucaſtle* in *Cumberland* (communicated by the Lord *Will. Howard* to Sir *H. Spelman*) appears to have been formerly much larger than * *Wormius* has given it; but it is now ſo miſerably defaced, that in 6 or 7 Lines none of the Characters are fairly diſcernible, ſave only ᚢᚠᛏᚺᚱ; and theſe too are incoherent, and at great Diſtance from each other. However, this *Epiſtylium Crucis* (as Sir *H. Spelman* has called it) is to this Day a noble *Monument*. It is one intire *Free-ſtone* of about 5 *Yards* in Height, waſhed over (as the *Font* at *Bridekirk*) with a white oily Cement, to preſerve it the better from the Injuries of Time and Weather. The Figure of it inclines to a ſquare Pyramid, each Side whereof is near 2 *Foot* broad at the Bottom, but upwards more tapering. On the *Weſt* Side of the Stone we have three fair *Draughts*, which evidently enough manifeſt the *Monument* to be *Chriſtian*. The loweſt of theſe repreſents the Portraiture of a *Layman*, with an Hawk or Eagle perched on his Arm: Over his Head are the forementioned *Ruins* of the Lord *Howard*'s *Inſcription*; next to theſe, the Picture of ſome *Apoſtle*, *Saint*, or other *holy Man*, in a *ſacerdotal* Habit, with a *Glory* round his Head. On the Top ſtands the Effigies of the *Bleſſed Virgin* with the *Babe* in her Arms, and both their Heads encircled with *Glories*, as before.

Runic Inſcriptions *at* Beaucaſtle; *by Mr.* Will. Nicholſon. *n.* 178. *p.* 1287.

On the *North* we have a great deal of *Chequer-work*, ſubſcribed with the following *Characters*, fairly legible.



Upon the firſt Sight of theſe *Letters*, I greedily ventured to read them *Rynburu*; and was wonderfully pleaſed to fanſy that this Word, thus ſingly written, muſt neceſſarily betoken the final Extirpation and *Burial* of the *Magical Runæ* in theſe Parts, reaſonably hoped for, upon the Converſion of the *Danes* to the *Chriſtian* Faith. For that the *Danes* were antiently groſs *Idolaters* and *Sorcerers*, and that they brought their *Paganiſm* along with them, is beyond Controverſy. This Conceit was the more heightened, by reflecting upon the natural *Superſtition* of our *Borderers* at this Day, who are much better acquainted with, and do more firmly believe, their old legendary Stories of *Fairies* and *Witches*, than the Articles of their *Creed.* And to convince me yet further that they are not utter Strangers to the *Black-Arts* of their Forefathers, I accidentally met with a Gentleman in the Neighbourhood, who ſhewed me a Book of *Spells* and *magical Receipts*, taken (2 or 3 Days before) in the Pocket of one of our *Moſs Troopers*; wherein, among many other *conjuring* Feats, was preſcribed a certain Remedy for an *Ague*, by applying a few barbarous Characters to the Body of the Party diſtempered. Theſe methought were very near akin to *Wormius*'s RAMRUNER, which, he ſays, differed wholly in *Figure* and *Shape* from the common *Runæ*.

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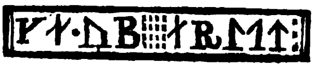
* *Mon. Dan.* p. 161.

But if this Conjecture be not allowable, I have another ſomething (it may be) more plauſible. For if, inſtead of making the 3d and 4th *Letters* to be two, ᚳ·ᚳ·ᚺ·ᚺ· we ſhould ſuppoſe them to be ᚷ·ᚷ· E. E. the Word will then be *Ryeeburu*; which I take to ſignify, in the old *Daniſh* Language, *Cæmeterium*, or *Cadaverum Sepulchrum.* For though the true old *Runic* Word for *Cadaver* be uſually written ᚼᚱᛁᚷ *Hrae*; yet the *H* may, without any Violence to the *Orthography* of that Tongue, be omitted at Pleaſure; and then the Difference of ſpelling the Word, here at *Beaucaſtle*, and on ſome of the ragged *Monuments* in *Denmark*, will not be great. And for the countenancing of this latter Reading, I think the above-mentioned *Chequer-work* may be very available; ſince in that we have a notable Emblem of the *Tumuli*, or *Burying-places*, of the Antients (Not to mention the early Cuſtom of erecting *Croſſes* and *Crucifixes* in *Church-yards*: Which perhaps, being well weighed, might prove another Encouragement to this 2d Reading). I know the *Chequer* to be the *Arms* of the *Vaux*'s, or *de Vallibus*, the old Proprietors of this Part of the North; but that, I preſume, will make nothing for our Turn; becauſe this and the other carved Work on the *Croſs* muſt of Neceſſity be allowed to bear a more antient Date than any of the *Remains* of that Name and Family; which cannot be run up higher than the *Conqueſt*.

On the *Eaſt* we have nothing but a few *Flouriſhes*, *Draughts* of *Birds*, *Grapes*, and other *Fruits*; all which I take to be no more than the Statuary's Fancy.

On the *South*, *Flouriſhes* and *Conceits*, as before; and towards the Bottom the following decayed *Inſcription*.



The Defects in this ſhort Piece are ſufficient to diſcourage me from attempting to expound it. But (poſſibly) it may be read thus:

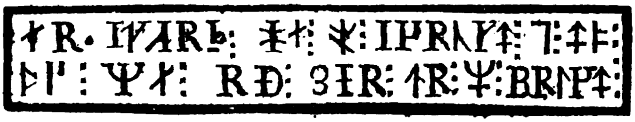
Gag Ubbo Erlat, i. e.
Latrones Ubbo vicit.

I confeſs this has no Affinity (at leaſt being thus interpreted) with the foregoing *Inſcription*, but may well enough ſuit with the Manners of both antient and modern Inhabitants of this Town and Country.

A Runic Inſcription *on the Font at* Bridekirk; *by* Will. Nicolſon. *n.*178.*p.*1291.

XXVIII. The Fabrick of the *Font* at *Bridekirk* in *Cumberland* does, I think, fairly enough evince that it is now uſed to the ſame Purpoſe for which it was at firſt deſigned: For on the *Eaſt* Side of this Stone we have fairly repreſented a Perſon in a long *ſacerdotal* Habit *dipping* a Child into the Water, and a *Dove* (the Emblem, no doubt, of the *Holy Ghoſt*) hovering over the Infant. Now I need not here obſerve, that the Sacrament of *Baptiſm* was antiently adminiſtred by *plunging* into the Water, in the *Weſtern* as well as *Eaſtern* Parts of the *Church*, and that the *Gothick* Word 𐌳𐌰𐌿𐍀𐌾𐌰𐌽 (*Mark* i. 8. and *Luke* iii. 7. and 12.) the *German* Word tauffen, the *Daniſh* døbe, and the *Belgick* doopen, do as clearly make out that Practice, as the *Greek* Word Βάπτω. Nor, that they may all ſeem to be derived from [δύπτειν], another Word of the ſame Language and Signification; and are evidently akin to our *Engliſh*, *Dip*, *Deep*, and *Depth*. Indeed our *Saxon* Anceſtors expreſſed the Action of *Baptiſm* by a Word of a different Import from the reſt: For in the fore-mentioned Place of St. *Mark*'s Goſpel their *Tranſlation* has the Text thus; Ic eoƿ fulliȝe on ƿætere. he eoƿ fullað on halȝum ȝaste. 7. 1. *Ego vos Aquis baptizo; ille vos Spiritu Sancto baptizabit.* Where the Word fulliað, or fulliȝean, ſignifies only ſimply *lavare*: Whence the *Latin* Word *Fullo*, and our *Fuller*, have their Original. But from hence to conclude that the *Saxons* did not uſe *Dipping* in the Sacrament of *Baptiſm*, is ſomewhat too harſh an Argument.

On the *South* Side of the *Stone* we have this *Inſcription*:



Now theſe kind of *Characters* are well enough known (ſince *Ol. Wormius*'s great Induſtry in making us acquainted with the *Literatura Runica*) to have been chiefly uſed by the *Pagan* Inhabitants of *Denmark*, *Sweden*, and the other *Northern Kingdoms*; and the *Danes* are ſaid to have ſwarmed moſtly in theſe Parts of our *Iſland*. Which two Conſiderations ſeem weighty enough to perſuade any Man, at firſt Sight, to conclude that the *Font* is a *Daniſh Monument*. But then, on the other Hand, we are ſufficiently aſſured, that the *Heathen Saxons* did alſo make uſe of theſe *Runæ*; as is plainly evident from the frequent Mention of Runcræftiȝen and Runſtafaſ in many of the *Monuments* of that *Nation*, both in Print and Manuſcript, ſtill to be met with. Beſides, we muſt not forget, that both *Danes* and *Saxons* are indebted to this Kingdom for their *Chriſtianity*: And therefore thus far their Pretenſions to a *Runic (Chriſtian) Monument* may be thought equal. Indeed ſome of the Letters (as Ð, Ʒ and ℸ) ſeem purely *Saxon*, being not to be met with among *Wormius*'s many *Alphabets*:

and the Words themſelves (if I miſtake them not) come nearer to the antient *Saxon Dialect*, than the *Daniſh*. However, let the *Inſcription* ſpeak for itſelf.

Er Ekard han men egroctten, and to dis men red wer Taner men brogten, i. e.

Here Ekard *was converted; and to this Man's Example were the* Danes *brought.*

Who this *Ekard* was, is a Queſtion hard to be anſwered. The proper Name itſelf is ordinary enough in the *Northern Hiſtories*, though variouſly written: And it is certainly a Name of Valour, and all others of the like Termination; ſuch as *Bernhard*, *Everhard*, *Gothard*, *Reinhard*, &c. So that it may well become a *General*, or other great Officer in the *Daniſh* Army: And ſuch we have juſt Reaſon to believe him to have been, who is here drawn into an Example for the reſt of his Countrymen.

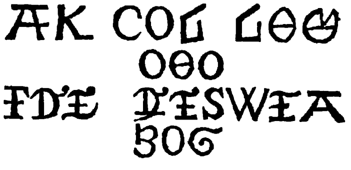
Han men egroctten; which rendered *verbatim*, is, *have Men turned*, i. e. *was turned*, is a Phraſe to this Day very familiar in moſt *Dialects* of the antient *Celtick Tongue*, though loſt in our *Engliſh*. In the *High-dutch* it is eſpecially obvious; as *Man Saget*, *Man hat gelaght*, *Man Lobet*, &c. And the *French* Imperſonals (*On dit*, *on fait*, &c.) are of the ſame Strain, and evident Arguments that the *Teutonick* and *Gauliſh Tongues* were near akin.

The Characters ↥ 亽 and 木 are manifeſt Abbreviations of ſeveral Letters into one; of which Sort we have great Variety of Examples in ſeveral of *Wormius*'s Books: And ſuch I take the Letter ⱦ) to be, inſtead of ƚ and þ; and not the *Saxon* Ð. I muſt believe ˥ to be borrowed from the *Saxons*; and ȝ I take to be a Corruption of their Ƿ or W. The reſt has little of Difficulty in it; only the *Language* of the whole ſeems a Mixture of the *Daniſh* and *Saxon Tongues*: But that can be no other than the natural Effect of the two Nations being jumbled together in this Part of the World. Our *Borderers*, to this Day, ſpeak a *Leaſh* of *Languages* (*Britiſh*, *Saxon*, and *Daniſh*,) in one; and it is hard to determine which of thoſe three Nations has the greateſt Share in the *Motly Breed*.

An antient Monument *at* Foultſham *in* Norfolk; *by Sir* P. S. *n.* 189. *p.* 361.

XXIX. In the Church-yard at *Foultſham* in *Norfolk* there is a *Tomb-ſtone* with this *Inſcription*, which ſome of the Learned in theſe Curioſities may perhaps explain.

On *one Side*
At *one End*
On the *other Side*
On the *other End*



Some Saxon Coins *found in* Suffolk; *by Sir* P. S. *n.* 189. *p.* 356.

XXX. 1. In *May* 1687. at *Honedon*, nigh *Clare* in *Suffolk*, the *Sexton*, as he was digging a Grave in the Church-yard deeper than ordinary, met with a *Skull*, and near it many Pieces of *Saxon Money*, which are generally of the ſame Bigneſs, *viz.* of a *Groat*, and about the ſame Weight: But the *Inſcriptions* are ſo *various*, that there are ſcarce two of them alike. I gueſs this *Variety* of *Inſcriptions* ariſeth from the many *Maſters of the Mint*, who were appointed to *coin Money* in ſeveral Places, and who might each of them have a different *Stamp*. For I have obſerved great *Variety* in *H.* III. *Coin*; viz.

NICOLE ON LVND.
WILLEM ON LVND.
WILLEM ON CINT. *Canterbury.* quær.
RICHARD ON GLOV.

Theſe Names being probably the *Maſters* of the *Mints*, the Laws as to the *Mints* being not altered, 1 *Hen.* VI. *Chap.* I. The *King's Council* might aſſign *Money* to be *coined* in as many Places as they would (*a*).

Theſe *Saxon Monies* were *Denarii*, or *Pennies*, which in *Ethelred's* Time was the 20th Part of the *Silver Ounce Troy*. Five of thoſe *Pennies* made a *Shilling*, and 240 of them made a *Pound*; which is the preſent Proportion of our *Penny* and *Pound*, though the intrinſick Value be about three to one different. There were (they ſay) between 200 and 300 Pieces: If 240, *i.e.* 1 *l.* then it would ſeem probable that the Deceaſed might have ordered ſo many to be buried with him, as a kind of *Expiation* for having privately killed a *Dane* of *ſervile* Condition; for in *Ethelred's Law* there is this Penalty, *Servilis Conditionis* Dacum *ſi* Anglus *morte affecerit*, *integram ſolvito* Libram: If more or leſs was found, it might anſwer another *Mulct* enjoined by the *Saxon Laws* for killing or maiming ſome Perſon of another Quality; or the *Æſtimatio Capitis* might be laid in the Grave with the Perſon that was killed. However, it is very probable, that the *Money* was *buried* upon ſome ſuperſtitious Account. *Vid. Fig.* 28. Greaves *of the* Denar. *p.*117.

On ſome of theſe *Monies* there are very odd *Saxon Characters*. Some are diminiſhed in their Weight by lying long under Ground, and ſeveral of them coloured *green* (*e*). The *Reverſe* of the 13th is the ſame with the 12th; that of the 14th is written round the *Croſs*, ſo are thoſe of the 18, 19, 20, 21; whereas moſt of them are not ſo; but there are *two Lines* of Letters with *three Croſſes* between them. The little *o* in ſome of them is periodical. The ⊢ in the 19th is a very clear Character, and ſtands for a Letter that is not defaced.

In the 20th *Reverſe*, [*Sterling*, &c.] P & T *paſſim confundi Docti obſervant* πεμπ *pro* [illegible], σπολὴ *pro* στο.., *&c.* Ruſpina *pro* Roſtina, &c. Bochart. *Geogr. p.* 450, 706. Denarium & Sterlingum *eundem eſſe* Nummum (Matth. Pariſ. *in* Hen. III. 13 Solidis & 4 Sterlingis *pro* Marcâ *quâlibet computatis*), *Vox ipſa* Sterling, *utrum formatur à Signo quod imprimebatur iſti* Nummo, & Sterlingus *ſit* quaſi Stellatus; *an potius* Eaſterlingus *denominatus à Populis, qui* Eaſterlings *dicuntur, ambiguum faciunt Scriptores.* Gronovius *de* Seſtertiis, *p.* 346. (*l.*) But I find *Gronovius* may be corrected in what he writes in the *Addenda* to the ſame *Treatiſe*, by this *Reverſe*; *Dubium non eſt* (ſays he) *ſi* Saxonibus Anglis *deberetur ea Vox*, Sterling *in* Monumentis *illorum repertam iri.*—*Conſtat inter omnes, ante* Normannorum Ingreſſum *in* Angliam, *non reperiri mentionem hujus Vocabuli*; *cum ipſo* Gulielmo *primum legi* Sterlingos, *&c. appellatos*; *ergo his debetur ea Vox in* Anglia. Yet I believe what he writes juſt before; Denariis *autem nomen etiam* Sterlinges *fuiſſe, in Continente quâ* Normanni *imperabant, oſtendunt duo Reſcripta* Pontificum Romanorum *in Decreto* Gregorii: And he might well have added, That the *Normans* borrowed of the *Franks* that Word *Sterling*, as well as *Deſcriptionem* Libræ *per* Solidos Denarioſque. But it may be, when *Gronovius* writ, no *Coin* nor *Monument* of *Antiquity* was then diſcovered in *England* that mentioned *Sterling* before *William* I. whoſe Name brings to Mind, that on his *Coin (n.) P* is put for *W*.

Gloſſ. Sir *H. Spelman* takes *Sterling* and *Denarius* to be the ſame; and he directs to the *Statute* made *An.* 1302. 31 *Edw.* I. wherein the *Penny* is called *Sterling*, and the Weight of the *Sterling* is 32 *Gr.* of dried Wheat (and I have weighed 32 *Gr.* of Wheat, and they are equal to 24 *Grains Troy* Weight, which is our *Saxon Penny)*. And *An.* 1496. 12 *Hen.* VII. *Cap.* 5. there is anether *Statute* wherein the *Sterling* is of the ſame Weight.

I am credibly informed, ſome of the *Egbert*'s and *Etbelbert*'s *Coin* were found amongſt them: Thoſe I ſaw were *Etbelſtan*'s, who began his Reign about the *Year* 925. *Edmund Etbeling*, his Brother (for I take the *Edmunds* to be his), who began his Reign 940. *Edred*, another Brother, who began his Reign 946.

Remarks; by W. W. Ib. *p.* 361. 2. (*a*) This *Law* was in Force till *Henry* VII. who firſt, that I can find, *quartered* the *Arms* of *England* with *France* in his common *Silver Coins*, on their *Reverſes*: This his Succeſſors have ſince followed, before they writ *Civit. London*; *Civitas Cantuariæ*; *Villa Caleſiæ*. The want of knowing this Cuſtom, has cauſed ſome learned Men to miſtake ſome *Coins* of *Edw.* IV. with *Civitas Norwic.* on the *Reverſe*, for *Medals* ſtamped in Memory of *Ket*'s *Inſurrection*, by *Edw.* VI. *Golden Medals*, in Memory of great Actions, are of antient Uſe amongſt us; witneſs that *Golden Coin* of *Edw.* III. where a *Shield*, with the *Arms* of *England* and *France* over a *Ship*, is ſtamped, to ſhew his Title to the Kingdom of *France*, which he then claimed; yet this can hardly be ſhewn in *Silver Coins*, which then paſſed for *current Money*; that ſeems to have been peculiar to the *Greeks* and *Romans*, except ſome Inſtances of theſe two laſt Ages. The ſingle Exception of *Edw.* III. who *quartered England* and *France* in his *Money*, doth not weaken my Aſſertion, ſince it was extraordinary, as a more publick Proclamation of the Juſtice of that *Title* which he ſet on Foot againſt *Philip de Valois*.

(*b*) This *Reverſe* [*n.* 1.] is to be read PENE PHEO; *i. e. Penny-Money*, a Duplication uſual amongſt the *Saxons*; ſo afterwards *Sterling Money*. *Febo*, or *Feob*, is a common Word for *Money*. St. *Mark* xii. 41. þa ſæt ſe hælend ongen þæne tollſcamol, ȝeſeah hu ꝥ folc- hyra feoh. *Then ſat* Jeſus *over-againſt the Treaſury, and ſaw the People put in* Money.

(*c*) LAND Ψ EHO [*n.* 2.] This was *coined* in Memory of a *Land-* , raiſed by *Ethelſtan* to ſupport his Wars againſt the *Danes* and *Scots*; inſt whom, eſpecially the *Scots*, he was always *victorious.* This is the ly *Ethelſtan*, who was ever King of *England*, who beat the *Danes* at *Sand-* *ich*, in *An.* 852.

The *Variety* of *Letters* in theſe *Reverſes* is remarkable: The laſt Word in theſe two *Reverſes* is manifeſtly to be read alike, yet the Form of the Letter is vaſtly different. This *Variety* aroſe from the Multitude of *Mints*, which did not all tie themſelves up to one *Stamp*, nor to the ſame *Letters*.

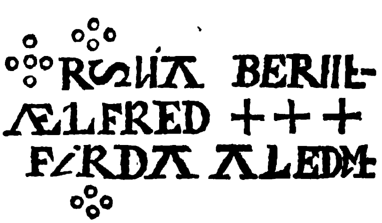
(*d*) This I ſhould read [*n.* 4.] *REgia Moneta*, to diſtinguiſh it from the *Biſhop*'s or *Abbot*'s, for it was *coined* at *Canterbury*; A, I take to be a *Mint-Maſter*'s Mark.

AREM
+ + +
ONETA

(*e*) Though theſe *Coins*, as far as I can judge, are as good *Silver* as any *current* with us, if not better; yet ſince what *Alloy* is in them is of *Braſs*, I am apt to think, that the *acid Steams* in a long Series of Ages ariſing from the *human Bodies*, might corrode ſo far into the Metal, as to raiſe ſome little *Verdegris* upon the Surface of the *Coins*; to which that *Greenneſs* is to be imputed.

(*f*) Probably this *Albericus* [*n.* 7.] was a Nobleman, and they might have had the *Jus Monetæ*, as well as *Biſhops* and *Abbots*; but I muſt confeſs I cannot make that out clearly. H before G is an uſual Tranſpoſition; ſo *H Clotharius*, *H Ludowicus*.

(*g*) This I read IVE MONETA [*n.* 8.], or *Ive-Money*, that is, *Money* coined at *St. Ives* in *Huntingdonſhire*. The *H*, as alſo H, both uſed for *M*, are remarkable. *Bouteroüe*, in his Diſquiſitions on the old *French Monies*, gives us ſome *Gallick Epitaphs* from which he draws an *Alphabet* of the old *Gauls*. In that *H*, ⊢⊣, are uſed for *M*; ſo that poſſibly the *Britons* might likewiſe uſe them. It is manifeſt they are not *Saxon Letters*; and I ſee no Abſurdity to allow the *Saxons* to have borrowed them from the *Britons*, and to have uſed them amongſt their own *Capitals*. There is a *Coin* in *Tab.* 3. *Coin* 14. of the *Collection* prefixed before *Elfred*'s *Life*, which has two other of thoſe *Gallick Letters* of which *Bouteroüe* has given us an *Alphabet*. The *Coin* is,



The ∽ and ⊢ are S and F in his *Alphabet*; and I am apt to think that that *Inverſion* of *Letters* in theſe *Saxon Monies*, as Ш for M, ⊢⊣

for Π, Ŀ for F, took its Riſe from them; for in this *Alphabet* we have △ and for ▽ D; ∽ S and Z for S: However, this will evince, in ſome meaſure, the Practice of ſuch *Inverſions*, which made ſome learned Men take them for *Runic*, *Gothic*, or indeed for any *Characters* with which they were little acquainted.

(*b*) [*n*. 9.] This, and the *Reverſe* of 11, are to be read alike, though they were *coined* at different Places; as appears from the *Variety* of the *Letters*.

(*i*) Ħ which is uſed here [*n*. 16.] for M, is frequently uſed in that *Collection* of *Saxon Coins* prefixed to *Alfred*'s *Life*.

(*k*) This *Gotæ Monæ*, or God's Money [*n*. 17.], was the *Peter-pence* which was collected yearly, and ſent to *Rome*. *Ina*, one of the Kings of the *Mercians*, firſt gave it; thence it was conſtantly paid afterwards, though now-and-then intermitted in the Heat of the *Daniſh* Wars. I ſuppoſe this Coin came out of an *Eccleſiaſtical Mint*.

(*l*) The true Original of *Sterling* is *Starry*. The common People obſerving the *Croſſes* upon the *Coins*, which looked like ſo many *Stars*, called them *Sterlings*, *Starry* Pieces. *Ling* is an *Adjective* Termination in the *Saxon Language*, ſo in time the Word became *Subſtantive*, and was uſed promiſcuouſly for *Penny*.

(*m*) The 19 and 21 *Reverſes* are to be read alike, though poſſibly they might be made from different *Stamps*. The *Letters* in both (for neither are very clear) will mutually explain each other. I read it MɅ HECH' HONE, or *Malmſbury Money:* The Ƅ, which is an intire Letter, ſeems to have been taken from the ſquare B, or Ƀ.

(*n*) This Ƿ was the old *Saxon p*, or *W*; ſo it was *Willem*, not *Pillem*. The *Saxon Character*, which was *full* and *plain*, gave Riſe to that ſmall beautiful Character which we uſually call the *Roman Letter*. The antient *Romans*, for ought that yet appears to the contrary, wrote all with one uniform *Character*, ſometimes greater, and ſometimes leſs, of the ſame Figure with the *Great Letters* in our *Alphabet*. This they took from the *Greeks*; and it is uſual in all the *Alphabets* of the *Oriental* Nations. The 3 *Inſcriptions* in *Gruter* (*pag*. 185. 3. *p*. 652. 2. *p*. 182. 7.) only prove that they had our ſmall *t*, *p*, *b*, *h*; for we have no Hints in our *MSS* of any others. After them ſucceed the *Francick* or *Merovingian Character*, intirely left off in tranſcribing Books after *Charlemagne*. The *Notaries* kept it longer; only by making it longer they brought it to ſomething like the *Italica*, to which it poſſibly gave Riſe. The Specimen in *Mabillon*'s fourth Book, *De Re Diplomatica*, will put this paſt Doubt. All this while the *Saxon Character* was uſed in *England*, whoſe *Alphabet* is evidently the ſame with the ſmall *Roman*, except ſome *Letters* which expreſſed Sounds proper to their *Language*; as ꝥ, þ, ð: Wherefore when *Alcumus* (Scholar to *Egbert*, Archbiſhop of *York*) went over into *France* to *Charles the Great*, and afterwards ſent for Books out of *Egbert*'s *Library*, as may be gathered from *William* of *Malmsbury*, he introduced that fine Way of *Writing*, which immediately took Place with all but the *publick Notaries*. *Mabillon* owns the Thing, in Effect, tho' he diſſembles the *Original: Primâ Stirpe extinctâ*, Carolus M.

Literas expolire cæpit, aut certe jam tantiſper expolitum Scripturæ *Genus à* Merovingico *in Elegantiorem Formam commutavit, quæ in eandem Formam evaſit, quæ hactenus* Minuti Romani Characteris *Nomen retinet (Lib.* I. *Cap.* 11. *Num.* 10.(And if this Change was not wrought in a Moment, becauſe the *Tranſcribers*, uſed to the old *Merovingian Hand*, conformed to the new as much as they could, yet that wore off by Degrees; ſo *Mabillon, quæ* [Carolina Scriptura] *principio nonnihil* Merovingici Characteris *habebat intermiſtum; at ſubinde Politior effecta, in eandem formam,* &c. *Mabillon* acknowledges that *Alcuin* introduced the modern Punctuation into the *French* MSS and *Records*, which he learned from the *Saxons*, particularly [.·.] for a full *Period*, as is manifeſt to all that ſhall look into the *Saxon* MSS, or printed Books in Imitation of them.

Beſides, all our *Latin* MSS in *England*, till ſome time afterthe *Conqueſt*, were writ in the *Saxon Character*. So Archbiſhop *Parker* publiſhed *Aſſerius Menevenſis*: and there are ſeveral *Latin* MSS in the *Univerſity Library* of *Cambridge*, written in the *Saxon Character*. And it is no Wonder that thoſe *Letters* which expreſſed Sounds not uſed in the *Roman Tongue*, ſhould be left out by the *French Tranſcribers*, who at the ſame time might uſe *Saxon Copies*; ſo that it is not ſtrange *Veſſius* ſhould be miſtaken, when he thought Ω and Ð were from the *Greek*, and Θ, who did not conſider them to be both *Runick Letters*, which were introduced upon a particular Occaſion by *Chilperic*, who took them from the *Viſigoths* in *Spain*, as *Wormius* (*de Literatura Runica*) has propably proved from *Gregorius Turonenſis*, and a *Conſtitution* of the ſame *Chilperic* printed in *Goldaſtus*: Yet I will not deny but *Theodore*, or ſome other of thoſe *Greeks*, who in that Age had ſo great Intercourſe with *England*, might introduce ſome *Greek Letters* to expreſs thoſe Sounds which they had not in their own *Language*: From hence they were carried into *France*, with the reſt of the *Saxon Alphabet*, and ſo into *Italy*; which *Mabillon* alſo in effect acknowledges, when he ſays, *Hanc tamen Scripturæ Formam non* Franci *à* Romanis, *qui* Longobardicis *paſſim* Elementis *tunc utebantur, ſed à* Francis Romani *accepiſſe videntur.*

3. Amongſt the few *Coins* which I purchaſed of the *Sexton* of *Honedon*, I find theſe 3 not mentioned by Sir *P. S. vid. Fig.* 29.

An Addition by Mr. Sam. Dale. *n.* 203. *p.* 874.

XXXI. 1. There was a curious Piece of *Antiquity* lately found at *Aſhelney* in *Somerſetſhire*, the Place where King *Alfred* built, as *Milton* affirms, a *Fortreſs*; but, according to *William* of *Malmsbury*, a *Monaſtery*, in Memory (as ſome have thought) of his Deliverance, obſcure Retreat to that Place, and Concealment in it from the *Danes*. The Work is ſo very fine, that ſome have queſtioned its true Age; but in all Probability it did belong to that great King. The Edge is thin, as far as the *Letters*. The *Letters* are on a Plane, riſing obliquely. All within the inner Pyramidal Line is on a Plane equidiſtant from the *Reverſe*. The Repreſentation (in that upper Plane) ſeems to be of ſome Perſon in a Chair. It is in Enamel, covered over with a Cryſtal, which is ſecured in its Place by the little Leaves com-

A Piece of Saxon Antiquity *found in* Somerſetſhire; *by Dr.* W. Muſgrave. *n.* 247. *p.* 441. *Fig.* 30.

ing over its Edges. In the *Reſerve* are Flowers engraved. The whole Piece may be of the Weight of 3 *Guineas*. The Cryſtal and the Enamel excepted, it is all of pure *Gold*. This perhaps was an *Amulet* of King *Alfred*'s.

By Dr. Geor. Hicks. *n.* 260. *p.* 464.

2. This curious Piece of *Saxon Antiquity* is in the Poſſeſſion of *Nathanael Palmer*, Eſq; of *Fairfield* in *Somerſetſhire*. The Air, the Shape of the Face, and the two united Scepters in each Hand of it, made me at firſt think that probably it might be that of our *Bleſſed Lord*; but having ſince ſeen a Picture of St. *Luke*, in a moſt ancient *Latin MS* of the *Goſpels*, all written in *Capitals*, with ſuch-like *Scepters* in each Hand, I am inclined to think that this was the common Way in thoſe Times of drawing and repreſenting *Saints* among the *Saxons*, and that the Picture in King *Alfred*'s *Antiquity* (for ſo I now call it) might be the Picture of his Patron St. *Cuthbert*, whom he and his Mother both in one Night dreamed they ſaw and heard ſpeak the ſame Words, in which he told him he ſhould conquer the *Danes*, and be a great King, and bid him be of good Courage. This Viſion of St. *Cuthbert* happened to him after he was beaten by the *Danes*, and had retired in great Diſtreſs into *Athelny*, where this *Antiquity* was found; and he was ſo affected with it, that he afterwards uſed to tell it all his Life long, and aſcribe his Succeſs over the *Danes* to the Merits of St. *Cuthbert*. And as the King uſed to commemorate the *Viſion* he and his Mother had of him, ſo it is very likely he ordered this Picture to be made of him, to hang down by a String upon his Breaſt, for a conſtant Memorial of the *Saint* who appeared to him, to bid him give the *Danes* Battle in a Time of great Deſpair, when he looked on himſelf as conquered, and thought his Kingdom almoſt loſt. That he cauſed the Picture to be made, is plain from the *Saxon Inſcription*.

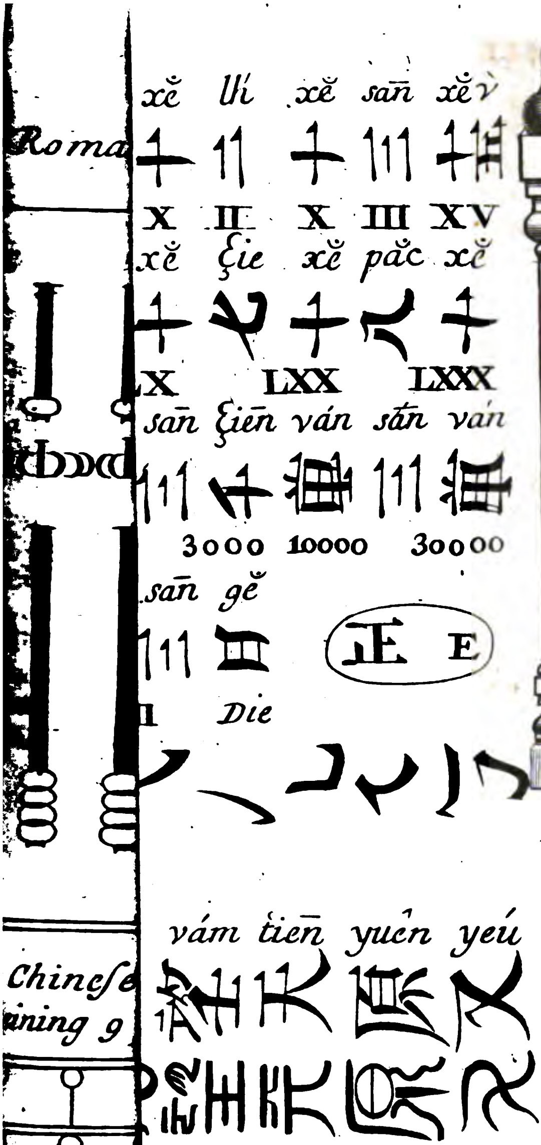
William *of* Malmsbury.

AELFRED ME[HETI GEWYR[AN.

Aelfredus me juſſit fabricari.

And that it was made to hang down upon his Breaſt, is plain from the *Cone* or *Apex* of the *Figure*. And that the *Original* is a true and *genuine Piece of Antiquity*, is alſo clear beyond all reaſonable Doubt, not only from the Place where it was found, the Place of King *Alfred*'s Retreat from the *Danes*, which he *fortified* in Time of War, and where he built a *Monaſtery* in time of Peace; but alſo from the *Inſcription*, which is all, except *two* in *Roman* or *Gallo-Italick Letters*, which the King, who was bred at the *Engliſh* School in *Rome*, preferred before thoſe of the *Saxon Duct*; and when he came to be King, as *Ingulph* teſtifies, he brought them into Uſe. Some I hear have ſuſpected this *Antiquity*, becauſe of its extraordinary Artifice, which they think too fine for that Age: But it is not to be doubted, but that King *Alfred*, who was ſo great a Prince, could eaſily procure the beſt Artiſts of that Age from all Parts of the Chriſtian World, by the Correſpondence and Intereſt which he had at *Rome*.

XXXII. *July*



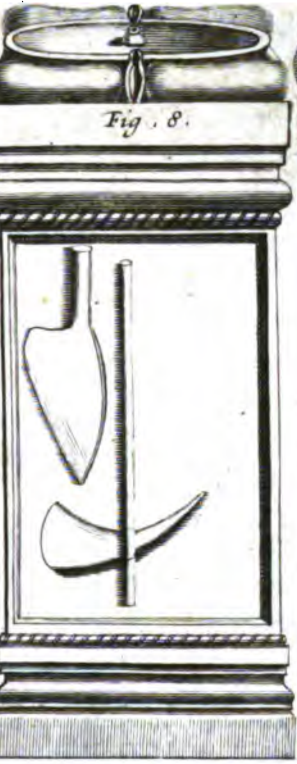


Fig. 8.

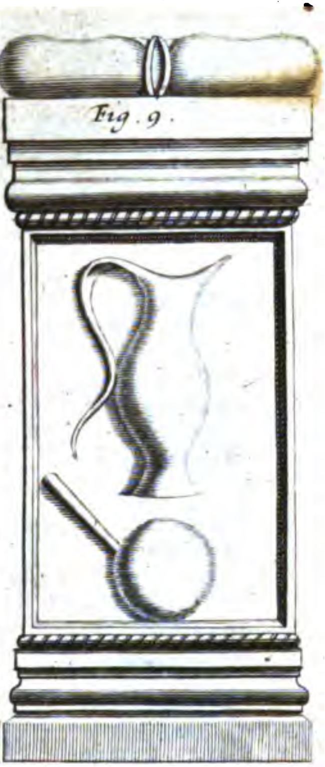


Fig. 9.

Fig. 6.

--\
---AE ʳ AN
-S ʳ SEC ʳ
---ENE M
--I ʳ ANO
-- CONVGI

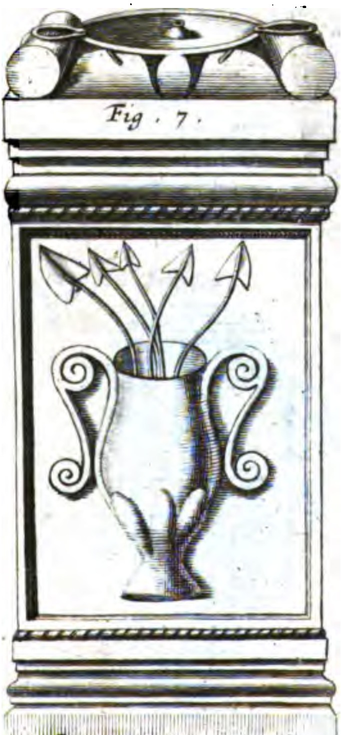


Fig. 7.

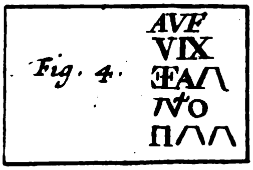


Fig. 4.

AVE
VIX
EAN
NO
ΠΛΛ

I.O.M
DIS.DEABVS QVE
HOSPITALIBVS PE
NATIBVS QOB CON
SRVATAM SALVTEM
SVAM.SVORVM Q
P.AEL.MARCIAN
VS PRÆF. COH
ARAM.SAC.F.NC.E

Fig. 5.

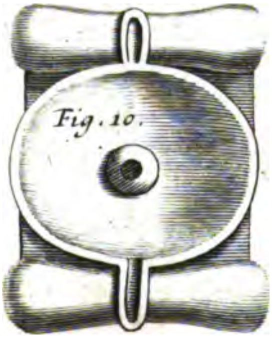


Fig. 10.

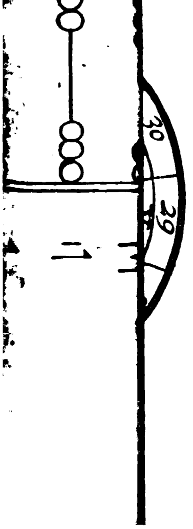


Plate 2.

Fig. 28.

12.

Revers

AN RE+ { P NE
+ + + (b)
FEHO

AN RE+ { LAND
+ + + (c)
ꝟEHO

grains
AN RE+ { ƧTEF
+ + +
ANVƧ

AN RE+ { AREM
+ + + (d)
ONETA

D RE+ { Ǝ ИƎB
+ + +
DICTVS

D RE+ { MAN
+ + +
ΛNO

D RE+ { ALB
+ + + (f)
ERIHG

D RE+ { IVEH
+ + + (g)
NETA

RE+ { ИT IL
+ + + (h)
ИAH

gr.
ND RE+ { MƎЯA
+ + +
ATƎNO

RE+ { LITIL
+ + +
ШAN

ND RE+ { MAN
+ + +
MANO

13 EADMVND RE+

14 EADHVND REPT+

Edmundi facies
REIHGRHZIOH
+

15 EADMVND RE+ { E RH
O+O
HO
+

16 24 gr.
EADΠVND REX { INGEL
+ + + (i)
GARH
+

17 25 gr.
EADHYND RE+ { GOTAE
+ + + (k)
HOIIE
+

18 +EADRED RE+ 21 gr.

Edredi facies
FREDRED MONETA+

19 +EADRED RE+

Edredi facies (m)
MANEEh INNO+

20 + EADRED

Edredi facies
ZPERLINL ԱONE

21 +EADRED REX 24 gr.

Edredi facies
ΙΙΆΗΕChΙΝοΝΕ (m)
+

Fig. 29.

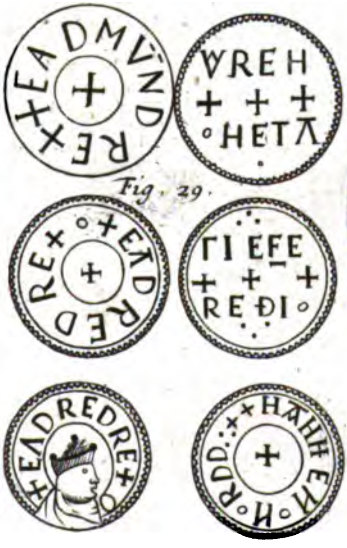
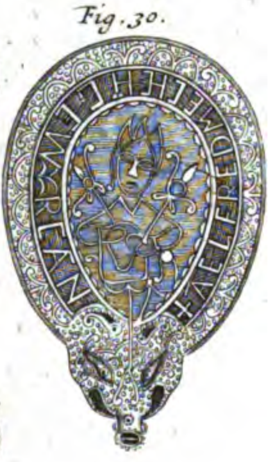
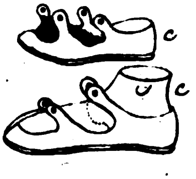


Fig. 30.





The Verbal Proceſs *upon the Diſcovery of an* ancient Sepulchre *found in* France; *communicated by Mr.* Juſtell. *n.* 185. *p.* 221.

XXXII. *July* 11. 1685, We *Olivier Eſtienne*, an Advocate in Parliament, ſubdelegated by Monſeigneur *de Marillac*, Counſellor of State in Ordinary, having the Conduct of the Works that are making upon the River of *Eure*, below the Village of *Paſſy*, do certify, that upon the Petition of Meſſire *Robert*, Prevoſt of *Cocherel*, Knight and Lord of the Manor of the Upper and Lower *Cocherel*, we having with us ſeveral Witneſſes, did come to the ſaid Town, and from thence to a Piece of Land called *Les Hautberges*: Where being come, the ſaid Lord of the Manor of *Cocherel* did remonſtrate unto us, that, having Occaſion for a conſiderable Quantity of Freeſtone, he had cauſed two great Stones, which appeared in this Place above Ground only as two Limits or Bounds, the one about a *Foot*, the other about 8 or 9 *Inches*, to be further uncovered, and that they had been found to be 6 *Foot* high, and about a *Foot* and a *half* thick; marked in the Figure of the Sepulchre *A* and *B*; the Breadth of the one, marked *A*, of 3 *Foot*, and the other, marked *B*, of 2 *Foot* and an *half*, ſet End-ways by one another; and they had further obſerved, that it was an *ancient Sepulchre*, ſhut only on 3 Sides, *viz.* at one End, at the Head, by the two Stones already mentioned, on the Right Side by a Stone placed Edge-ways upon its Thickneſs, of about 14 *Inches*, and being above 5 *Foot* and a *half* long, and about 3 *Foot* broad, touching in a right Angle. The Stone marked *B* at the Head; and at the Feet another Stone was ſet, marked *D*, of the ſame Thickneſs as the precedent, and about 4 *Foot* Square: All theſe Stones were cemented together with Morter made of the Chalk or Marle taken out of the ſame Hole, mingled with little Stones or Gravel.

Fig. 31.

That in this *Sepulchre* were found the Bones of about 20 Bodies of Men of the *ordinary Stature*, between 5 *Foot* and a *half*, and 6 *Foot*, except 2 Youths of about 15 or 16 Years old: All theſe Bodies lay extended *North* and *South*, the Arms along the Bodies, and the Heads all placed along the two Stones *A*, *B*. In the right Angle there were 2 Bodies ſeparated from 2 others by the Stone *E*, of about a *Foot* thick, 4 *Foot* broad, and 5 *Foot* and a *half* long, that lay in the Manner of a *Tomb-ſtone* upon the two Bodies underneath. All theſe Heads had very fair ſound *Teeth* in them, and the *Cranium* and other Bones of the Head, were much ſtronger and thicker than thoſe of ordinary Heads; which argues them to have been of ſtrong well conſtitutioned Men; amongſt them all there was not any *Woman*'s Head.

In proceeding ſtill to examine the *Sepulchre*, we did obſerve, that at the ſame Diſtance from the Superficies of the Earth, and from thoſe Bodies thus buried, there were 3 little *Earthen Pots*, of about 4 *Inches* Diameter, and between 4 and 5 *Inches* high, of a black Earth as ſoft as Wax, which could not be ſeparated from the other Earth without breaking them; and the Pieces, being come into the open Air, turned of a greyiſh Colour, and grew hard: Theſe Pots were full of *Wood-coals* and *Aſhes*, which were not much examined.

All theſe large Stones of the *Sepulchre* were rough, and had not been cut, but ſeemed to have been fetched from a neighbouring *Quarry*, which is about 400 *Foot* off, upon the ſame Hill.

We obſerved beſides, that in the Place where were laid the two Heads of the Bodies that lay upon the *Tomb-ſtone* E, there were found two Stones; the one whereof was about 6 *Inches* long, and ſome 15 *Lines* broad in its broadeſt Place, and about 4 *Lines* thick; framed like the Head of a *Pike*, very ſharp and cutting at both Ends and on the Sides; it was a *yellow Flint*, of which the beſt Firelock-ſtones are made, being almoſt as hard as an *Agat*. The other Stone, which was likewiſe under one of theſe Heads, was ſhaped like the Head of an *Ax*, about 4 *Inches* long, and 3 *Inches* broad, having a Hole at the narroweſt End, and about 6 *Lines* thick, very ſharp, and of a greeniſh Stone, ſpotted with white Spots, as hard as *Agat*: The *French Lapidaries* call it *Pierre de Jade*, for the *Nephritick Stone*.

Under the two Heads, which were under the *Tomb-ſtone* E, there were alſo found two other Stones; the one much of the ſame Nature with that firſt deſcribed, but ſomething longer, and the ſharp End a little dulled. The other was likewiſe in the Shap of an Ax-Head, very ſharpe and cutting, of about 3 *Inches* long, and 2½ broad, and 6 *Lines* thick, with a Hole in it at the narrow End: The Stone was of a dark-green Colour, which the *Lapidaries* call *Oriental Serpentine*.

On the left Side of the *Sepulchre*, which was open, there were 16 Bodies in the ſame Situation as the firſt placed *North* and *South*, their Heads along the great Stone A, and the Arms extended along the Bodies, the Bones all entire, though they appeared very ancient; and after two Days lying in the Air fell all to Duſt.

All the Bones of theſe Heads, as has been ſaid before, were very thick; there was one that had been pierced by ſome Blow, and Nature had repaired the Wound; within, the Hole was round, as having been made by ſome ſharp round Weapon, which argued likewiſe the wounded to have been a Soldier. Under every one of theſe Heads there was a little Stone; two were round, one of a reddiſh Colour, of about an *Inch* thick, having a Hole at each End, which leſſened and grew narrower towards the Middle; another of Cheſnut-Colour, and about the Bigneſs of a Cheſnut, made in the Shape of a Coat-button, with a Hole clean through it, but roughly poliſhed and hard, ſeeming on one Side to have ſuffered by the Fire.

There were likewiſe two other little Stones, which according to Probability were under the Heads of the young Bodies; whereof one was about 2 *Inches* long, and 8 *Lines* broad, and 2 *Lines* thick, pretty ſharp at the broader End, and having a Hole at the narrow End: It is thought to be of the ſame *Pierre de Jade*, green and white, but it is nothing near ſo hard as the firſt. The other Stone was about 17 *Lines* long, 8 broad, and 2 *Lines* thick, ſomewhat ſharp at the broad End, and having 2 Holes at the narrow End, the one bigger than the other: It is thought to be of a *white Marble* or *Alabaſter*.

There were moreover found under theſe Heads three Stones, whereof two were of a *grey Pebble*, ſuch as we find by the Sea-ſide, ſhaped like *Axes Heads*, ſharp and poliſhed, about 4 or 5 *Inches* long, and 4 broad at the broadeſt End, about 1½ *Inch* at the narroweſt, and in the Middle about an *Inch* thick. Theſe Stones were by their narrow End to be put into a Piece of *Stag's Horn* fitted to receive them, as appeared by ſeveral Pieces found in this *Sepulchre*, which had an oval Hollow at the End to receive one of theſe Stones: Theſe Pieces were about 6 *Inches* long, and had a Hole at the other End by which they might be faſtened to a longer Stick. The third Stone was of the Shape of the precedent, but of a *black Pebble* like a *Flint*, of which this Country is very full; and it was beſides remarked, that the Pieces of *Stag's Horn* were worn at the End, and poliſhed upon ſome Stone, but not cut with Iron.

Under all the other Heads there were 10 little Stones, like *black Flint*, one under each Head, cut all in the ſame Shape, ſmooth on one Side, and ſharp on the other; it is thought they might uſe them as *Knives*.

There was likewiſe found in the ſame Place, under one of the Heads, a Stone, which within was of *black Flint*, having the Outſide of a white Subſtance, as that Sort of Stone uſes to be: This had two Eminences like Teeth, which we took to be natural, and not artificial. All theſe Stones, thus placed under their Heads, ſhewed that they had them in great Eſteem.

Amongſt theſe dead Bodies have been alſo found ſome Bones ſharpened, to put at the End of a Stick, or at the End of an Arrow; one was of the ſmaller Bone of a *Horſe's Leg*, and the other was made of the ſharp End of the *Andouilleres* of a *Stag's Horn*.

Amongſt all theſe Stones there has been found no ſort of *Inſcription*, *Sculpture* or *Character*, either in *Relievo* or otherwiſe, which might oblige us to think that theſe Men had any Knowledge of *Chriſtianity*, but rather that they had ſome *idolatrous Superſtition*, as theſe Stones ſeemed to indicate. Wherefore we thought fit to declare to the ſaid Lord of the Manor of *Cocherel*, that he might without Scruple uſe theſe Stones for what he thought fit.

Since the Expedition of the preſent *verbal Proceſs*, there having been further Digging on the Left-ſide of this *Sepulchre*, it has been diſcovered that the Bottom of the *Sepulchre* was raiſed, and not ſo deep by a *Foot* and a half as that Part where the Bodies were buried. And it is perceivable, that in this Place ſeveral Bodies have been burnt whoſe *Aſhes* and *burnt Bones* have been thrown confuſedly into this Hole: And it is obſervable, that all along the *Sepulchre*, there is a Vein of *Coals* and *Aſhes* which runs about 2 *Foot* below the Superficies of the Earth, and all theſe *Aſhes* and *Bones* are under this Bed of *Coals* and *Aſhes*, which are ſo ſalt and pungent, that they make one ſneeze; and when theſe *Bones* are handled, they produce a Tingling in one's Fingers Ends, as if one had handled the ſharpeſt *Salt-Petre*.

It ſeems difficult how to reconcile the two Ceremonies of *Burying* and *Burning*, except that we ſhould ſay there has been a Fight in this Place between the

Gauls and ſome *barbarous Nation* who had invaded them; that the *Gauls* have burnt their Dead, and ſacrificed to the *Manes* of them their Priſoners taken in War, whom they buried with the Ceremonies proper to thoſe *Barbarians*, the Thickneſs of whoſe *Skulls* ſhew that they went bare-headed, and their *Arms* ſhew that they had not the Uſe either of *Iron* or *Braſs* to make *Arms* of, but uſed ſuch as Nature afforded firſt, as ſome *Indian* Nations do now.

The Figures *of ſeveral* Antiquities; *by* ..... *n.* 175. *p.* 1159. *Fig.* 32, 33, 34, 35, 36, 37, 38, 39.

XXXIII. 1. *Fig.* 32. A *Ring* of *Corinthian Braſs*, with a Vizard of *Silenus* in a *Sardonyx*.

33. An *Amulet* of the *Gnoſticks*, cut in a *Chalcedonian*, the Names of certain *Æones* or Intelligences.

34. A *Teſſera* of Cryſtal, having on one Side XIIII, on the other IΔ.

35. A *Fortune* and a half *Diana*, in an *Onyx*.

36. An ancient Picture of the *Virgin*, in a *Chalcedonian*.

37. A *Cameus*, with a Mixture of ſeveral *Gods*.

38. An *Onyx*.

39. A Glaſs *Lachrymatory*.

By .... *n.*176.*p.*1201. *Fig.* 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61.

2. *Fig.* 40, 41, 42, 43, 44, 45, Res *Turpiculæ*, or *Priapi*, worn by *Roman Children* againſt *Faſcination*. 46, An *Egyptian* Braſs *Serapis*, or *Teraphim*. 47, A Braſs *Stilus Scriptorius*. 48, 49, Old *Roman Keys* of Braſs, one being a Ring to wear on a Woman's Finger. 50, An *Iron Die*, or *Alea*. 51, A *flat* Iron *Die*, or *Talus*; upon the narrow Sides are 6. 5. 2. and 1. 52, A *Roman* Iron *Ring*. 53. An old *Roman* Braſs *Ring*, marked XXXV, for a *Slave* to wear. 54, A Braſs *Roman Ear-Ring*. 55, A Braſs *Lunula*, or *Meniſcus*. 56, A Braſs *Fibula*. 57, 58, 59, 60, 61, ancient *Paſts*, or opaque *Enamels* of divers Colours, for *Pavements* taken up at *Baiæ*.

An uncommon Inſcription *on a very great Baſis of a Pillar lately dug up at* Rome; *by M.* Adrian Auzout. *n.*183.*p.*172.

XXXIV. This *Inſcription* was copied from the Stone by M. *Adrian Auzout*, and ſent by him to M. *Juſtel*. It is threefold upon 3 Sides of the *Baſis*, as follows:

P. SVFENATI. P. F. PAL. MYRONI
EQVITI. ROMANO. DECV
RIALI. SCRIBARVM. AEDILI
VM. CVRVLIVM. LVPERCO. LAVRENTI
LAVINATI. FRETRIACO. NEAPOLI. ANTI
NOITON. ET. EVNOSTIDON. DE
CVRIONI. IIII, VIRO. ALBA
NI. LONGANI. BOVILLEN
SES. DECVRIONES OB ME
RITA EIVS. L. D. D. D.

P. SVFENATI. P. F.
PAL. SEVERO. SEMPRO
NIANO. DECVRIALI
SCRIBARVM. AEDILIVM. CVRV
LIVM. FRETRIACO. NEAPOLI. EV
NOSTIDON. DECVRIONI. ET
SACERDOTI. APOLLI
NIS. ALBANI. LONGA
NI. BOVILLENSES. DE
CVRIONES. OB. MERI
TA. SVFENATIS. HER
METIS. PATRIS. EIVS
L. D. D. D.

P. SVFENATI. P. F.---
MIRONI.
EQVITI. ROMANO. DEC---
ALI. SCRIBARVM. AED---
CVRVLIVM. LVPERCO---
TI LAVINATI. FRETRIAC---
APOLL. ANTINOITON---
NOSTIDON. DECVR---
IIII. VIRO. ALBANI---
GANI. BOVILLEN---
MVNICIPES. OB.
EIVS. L.--- D.---

Explained by Dr. Voſſius. Ibid. p. 174.

2. Bene noſti *Claſſem Ægyptiacam* ſive *Cataplum Alexandrinum* antequam Portus *Oſtiæ* eſſet extructus, ſingulis Annis appuliſſe *Puteolos*, unde demum Frumentum *Romam* deferebatur. Poſtquam vero *Auguſtus*, & *Claudius Cæſares* & poſtea *Nero Oſtiæ* Portum aperueruut, jam Annona non tantum *Puteolos*, ſed & longe maxima ſui parte *Oſtium* appetebat. Conſtat autem tempore *Tiberii* pulſos *Româ* fuiſſe *Judæos* & *Ægyptios*; unde factum eſt ut ab *Oſtia* per *Agrum Laurentem* deportaretur Frumentum *Ariciam* & *Albam Longam* uſque ad *Bovillas*, ad Decimum nempe ab Urbe Lapidem; neque enim longius progredi permittebatur. A *Bovillis* enim *Romam* per *Inſtitores Romanos* deferebatur. Neque enim *Ægyptiis* aut *Judæis* in Urbe habitare aut Horrea habere erat licitum. Menſoribus vero & Venditoribus Frumenti *Oſtiæ*, & paſſim alibi, præfuiſſe *Decuriones*, & hoc quoque ex Jure conſtat. Sed vero omnibus iſtis minoribus *Decurionibus*, qui in ſingulis Locis & Urbibus Frumenti Curam haberent, præfuiſſe alium *Decu-*

Decurionem, qui vicem *Præfecti Annonæ* obiret, & in omnibus iſtis Inferiorum *Decurionum* Collegiis Primum teneret Locum; id manifeſtè ex hac patet *Inſcriptione*, ubi Minores *Decuriones Bovillani* Honorem faciunt *Equiti Romano* & *Palatino*, qui *Decurio* ſeu *Curialis* & *Fretriacus* in omnibus eſſet Locis & Urbibus, à quibus & per quas Annona *Ægyptiaca Romam* devehebatur. *Decuriones* vero pro motos fuiſſe ad Honorem *Sacerdotii* ita ut ſimul *Flamines*, *Luperci*, *Epulones Jovis*, & *Paraſiti* fierent *Apollinis*; & hoc quoque multis conſtat Exemplis. Omne verò dubium tollit, quod in hac *Inſcriptione Eques* ille *Romanus* vocetur *Antinoiton* & *Eunoſtidon Decurio*. *Antinoi* enim Urbs præcipua tum temporis *Ægypti Superioris* erat Civitas, unde per multas Foſſas Frumentum deferebatur ad *Mareotin* Lacum, qui ad *Eunoſti* Portum exit in Mare. Ab hoc Portu dicti *Eunoſtidæ* Curatores Frumenti *Ægyptiaci*; unde demum confectus de Dec. *Eunoſtus* Rei Frumentariæ Inſpector, qui huic præſideret Portui.

An ancient Sepulchre *near* Rome; *by* - - - - *n.* 185. *p.* 227.

XXXV. In an Inundation of the *Tiber*, *An.* 1686, the Water having pierced a ſtrong thick Wall, which joined to a great Country Palace about 2 Miles from *Rome*, and paſſing under the ſame, broke out at a Corner of an *Aqueduct* by the ſaid Houſe, where there was found a ſmall Vault of an oval Figure, in which there was a Stone *Sepulchre* pretty large, with the following *Inſcription*, P. M. R. C. *cum Uxore*; . . . and more which could not be diſcerned: By this ſame there was a great earthen *Urn* ſhut up very cloſe, which being opened, there came out a ſtrong Smoak, that it made the Man that was by it almoſt giddy: The Smell was like *Bitumen*, but being quickly diſperſed, they found in the Bottom of the ſaid *Urn* an earthen Pot made up as a Lamp, full of a *Materia Oleoſa*, which by Degrees, as the cold Air got into it, grew hard. Several Perſons ſuppoſe this to be one of thoſe *perpetual Lamps* that the Ancients mention.

An Etruſcan Inſcription; *by Mr.* Octavian Pulleyn. *n.* 228. *p.* 539. *Fig.* 62.

XXXVI. I here ſend you an *Inſcription* on an old *Urn* in the *Etruſcan* Language; the Character ſeems to be not much unlike the *Runick*. *Vid. Fig.* 62.

The Catacombs *at* Rome; *by Mr.* J. Monro. *n.* 205. *p.* 643.

XXXVII. The *Catacombs* at *Rome* are a narrow *Gallery*, dug and carried a vaſt way under Ground, with an infinite Number of others going off it on all Hands, and an infinite Number of little Rooms going off the Principal and them too. Thoſe commonly ſhewed Strangers are thoſe of *San Sebaſtiano*, thoſe of *San Lorenzo*, thoſe of *Sant Agneſe*, and the others in the Fields a little off of *Sant Agneſe*. They take their Names from the Churches in their Neighbourhood, and ſeem to divide the Circumference of the City without the Walls between them, extending their *Galleries* every-where under, and a vaſt way from it; ſo that all the Ground under, and for many Miles about it, is ſaid to be hollow. I have alſo ſeen thoſe at *Naples*, and, as they ſay, there are *Catacombs* in the Neighbourhood of all the great Towns of that Part of *Italy*.

Some Authors will have them made by the *Primitive Chriſtians*; adding, That in the Times of *Perſecution* they lived, held their Aſſemblies, and laid up the Bodies of their Martyrs and Confeſſors in them. This is the Account that prevails at *Rome*, and conſequent to it there are Men kept conſtantly at work in them. As ſoon as thoſe Labourers diſcover a *Repoſitory*, with any of the Marks of a *Saint* about it, Intimation is given to the *Cardinal Treaſurer*, who immediately ſends Men of Probity and Reputation to the Place; where they find a Palm painted or engraven, or the Cypher Xp, which is commonly read *pro Chriſto*, or a ſmall round Projection in the Side of the *Gallery*, a little below the *Repoſitory*. What is within it is carried to the Palace. Many of theſe Projections we have ſeen open, with Pieces of the Phials in them; the Glaſs indeed was tinctured, and it is pretended, that in theſe Phials was conſerved the Blood of the *Martyrs*, which was thus laid up nigh their Bodies, towards their Head, to diſtinguiſh them from thoſe of the others that were not called to the Honour of laying down their Lives for the Faith of the Goſpel. After the Labourers have ſurveyed a *Gallery*, they do up the Entry that leads into it: Thus moſt of them are ſhut; nor are more left open than what is neceſſary to keep up the Trade of ſhewing them to Strangers. But to this Opinion it may be juſtly excepted, that allowing the *Catacombs* to be proper for the End for which they are preſumed to be made, and that the *Chriſtians* of that Age were in a Capacity of making that Convenience for themſelves to live and aſſemble in below Ground, at a Time when it was ſo very unſafe to appear above it; yet to ſuppoſe that a Work of that Vaſtneſs and Importance could be carried on without the Knowledge of the Government, is to ſuppoſe the Government aſleep, and that that was actually done under its Noſe, that muſt neceſſarily have alarmed it, had it been attempted on the Frontiers of the Empire.

Another Sort of Authors repreſent them as a Work of that Vaſtneſs, that the *Chriſtians* in the perſecuting Times had not Number enough to carry it on; but then moſt unadviſedly confound them with the *Puticuli* in *Feſtus Pompeius*, where at the ſame Time that the antient *Romans* uſed to *burn* the Bodies of their *Dead*, the Cuſtom was, to avoid Expence, to throw thoſe of the *Slaves* to *rot*. The *Roman Chriſtians*, ſay they, obſerving at length the great Veneration that certain Places gained by the Preſence of *Relicks*, reſolved to provide a Stock for themſelves: Entering therefore the *Catacombs*, they made in ſome of them what *Cyphers*, what *Inſcriptions*, what *Painting* they thought fit, and then ſhut them up; intending to open them again upon a Dream, or ſome other important Incident. The few that were in the Secret of this Artifice either dying, or as the *Monks*, who were the only Men that ſeem to have Heads adapted to a Thought of this Quality, were ſubject to many Removes, being tranſported to other Places, the Contrivance came to be forgot, and thoſe *Galleries* continued ſhut, till Chance, the Parent often of great Diſcoveries, opened them at laſt. Thus they conclude the Remains of the vileſt Part of Mankind are trump'd up in the Church for the Bodies of the moſt eminent *Confeſſors* and *Martyrs*.

But ſurely either the *Catacombs* are not that great Work they are repreſented to be, nor to be found every-where about the City, or it was very improper in *Feſtus Pompeius* to call them by the little Name of *Puticuli*, and to confine them to one Place only, that I mean unknown now without the *Eſquilin-Gate*. The true Notion of the *Puticuli* is this; Holes dug perpendicularly in the Ground, to throw Bodies indifferently, and without any Decency in; and this was the Conduct of the antient *Romans* with reſpect to their *Slaves*, as implying Simplicity, and the Care to avoid a greater Expence. After the ſame manner, when the *Perſecutors* ſpilt the Blood of ſo many *Martyrs*, they uſed to dig Holes perpendicularly in the Ground, and to throw the Bodies promiſcuouſly in them: And of this the Memory is ſtill conſerved, Churches being built in the Places where the Holes were made, and little *Monuments* erected over the Holes themſelves, to which the Name of *Putti* is continued to this Day. But what is all this to the *Catacombs*, where *Repoſitories* are cut, in the Face of a long *Gallery*, one over another, ſometimes to the Number of ſeven, in which Bodies were ſingly laid, and handſomely done up again, ſo that nothing could offend the View of thoſe that went in, eſpecially with the little Rooms, of the Faſhion of *Chapels*, that have all the Appearances of being the *Sepulchres* of People of Diſtinction? And if they were kept in better Repair, they would be, without Diſpute, the *nobleſt Burying-places* this Day in the World.

As often as they fall under my Conſideration, I cannot forbear thinking they were made for this End by the antient *Romans*, and made in Conſequence of thoſe two antient Opinions, that the *Shadows* hate the Light, and love to hover about the Place where the Bodies are laid: They appear ſo eaſy and decent a Reſting-place for the one, without the leaſt Fear of being ever diſturbed, and at the ſame time there is provided a noble and vaſt Convenience, full of Variety, for the others to ſolace themſelves freely, and with Pleaſure in.

I think it will not be denied, that laying up the Bodies in *Caves* was the original Way of diſpoſing of the *Dead*: This was that of the *Phœnicians*; and as they were the Men that with their Colonies peopled the *Weſtern Parts* of the World, it is more than probable they carried it along with them whitherſoever they went. Afterwards, as Men grew great and powerful, they erected noble and magnificent *Monuments* for themſelves above Ground; at length others of inferior Degree imitated them, all leaving Room enough, and excluding the Light. But then *Interring*, as we do now, in the open Air, or in the Temples, was never the Manner till *Chriſtianity* brought it in. Of the Whole we have many Inſtances, and *Il Signior Abbate Bencini*, *Bibliothecary* of the *Propaganda*, a Gentleman of good antient Learning, aſſured me, in the Converſation I had with him on this Argument, that on the great Roads in moſt Parts of *Italy* little *Catacombs* have been, and are ſtill found under Ground, and that it was the Cuſtom to build little Houſes over them. And as to the Marks of a *Martyr*, he added, that they do not conclude much; that the ſo famed Cypher Xp was in Uſe among the Antients long before *Chriſtianity* began, and that it was compoſed of the two *Greek Letters* XP, under which ſomething *myſtical* was comprehended; but that he met with no other Author that gave Account what the *Myſtery* was.

Thus, after a Multitude of Thoughts about the *Catacombs*, I am forced to take up with this; ſo natural it is, ariſing from the ſole Theory of the Place, and falls in ſo appoſitely with the Religion and Practice of the Antients, among whom the *Dii Manes* were the *Tutelary Gods* of the Country, and D M at the Head of an *Inſcription* argues the *Moles*, the *Sepulchre*, the *Monument*, &c. were in the primary Intention made for, and dedicated to the *Soul*. Upon the ſame Maxims, in foreign Expeditions, when a Hero died or was killed, as the Body was liable to a quick Corruption, and for that Reaſon unfit to be tranſported intire, they fell on the Expedient of *Burning*, in order to bring Home the *Aſhes*, to oblige the *Manes* to follow, that ſo the Country might not be deprived of the Benefit of its *Tutelage*. This I humbly conceive was the Original of *Burning*, which by Degrees became more and more univerſal, till at laſt the Pomp and Magnificence of it reconciled it to all that were able to go the Length of the Expence. As for the Prejudice of the *Silence* of the *antient Authors* in this Matter, it is eaſily removed, and to be regretted at the ſame time that the Authors of all Ages too much neglect the Cuſtoms of their own Time. Writing for the Satisfaction of their Contemporaries, they think it impertinent to trouble them with the Account of what they ſee tranſacted every Day. By this means the antient Cuſtoms, with the Time and Reaſons of their Diſuſe, are loſt with reſpect to us, and ours with the ſame Circumſtances may come to be ſo with relation to Poſterity.

Upon the whole Matter, the *Catacombs*, I humbly conceive, were the *Burying-places* of the antient *Romans*; at length the Manner of *Burning*, which they received from the *Grecians*, coming by Degrees to prevail univerſally, they fell under a total Neglect. This is the State in which the *primitive Chriſtians* muſt be ſuppoſed to have found them. And therefore here they laid up the Bodies of their Dead; and perhaps when the *Perſecution* was hot, concealed themſelves, and kept little ſeparate Aſſemblies in their Chambers. At laſt the Empire turning *Chriſtians*, they fell again into the old State of Neglect, in which they continued till upon the Reading of I have forgot what Author that makes mention of them, they came to be looked into, and ſearched.

What I have writ relates to the *Catacombs* of *Rome*, thoſe of *Naples* are a quite other Thing.

Obſervations on a Voyage from Venice *to* Smyrna; *by Mr.* Fr. Vernon. n. 124. p. 575.

XXXVIII. I ſet out from *Venice* [in 1675] with thoſe Gallies which carried their Ambaſſador that went for the *Port*. We touched at moſt of the conſiderable Towns of *Iſtria* and *Dalmatia* by the Way. In *Iſtria* we ſaw *Pola*, an antient Republick. There remains yet an *Amphitheatre* intire: It is of two Orders of *Tuſcan Pillars*, placed one over another, and the lower Pillars ſtand on *Pedeſtals*, which is not ordinary; for commonly they have nothing but their *Baſes* to ſupport them. There is, beſides a

Temple dedicated to *Rome* and *Auguſtus*, a *Triumphal Arch*, built by a Lady of the Family of the *Sergii*, in Honour of ſome of her Kindred, which commanded in thoſe Countries; beſides ſeveral *Inſcriptions* and *antient Monuments* which are in divers Parts of the Town.

In *Dalmatia* I ſaw *Zahara*, which is now the *Metropolis* of the Country. It was antiently called *Jadera*. It is now very well fortified, being encompaſſed on 3 Sides with the Sea, and that Part which is toward the Land extremely advantaged by all the Contrivances of Art, having a *Caſtle* and a *Rampart* of very lofty *Baſtions* to guide it. I found here ſeveral *antient Inſcriptions*. We paſſed in Sight of *Zebenico*, and ſaw 3 *Forts*, which belong to the Town, *St. Nicolo*, *St. Gionni*, and *La Fortezza Vecchia*. That which is moſt worth ſeeing in *Dalmatia*, is *Spalato*; where is *Diocleſian's Palace*, a vaſt and ſtupendous Fabrick, in which he made his Reſidence, when he retreated from the Empire. It is as big as the whole Town; for the whole Town is patched up of its Ruins, and is ſaid by ſome to take its Name from it. The Building is maſſive; there is within it an intire Temple of *Jupiter*, eight-ſquare, with noble *Porphyry Pillars* and *Cornice*, worth any body's Admiration. There is a Court before it, adorned with *Ægyptian Pillars* of that Stone called *Pyropoicilos*, and a *Temple* under it now dedicated to *St. Lucia*; and up and down the Town ſeveral Fragments of *Antiquity*, with *Inſcriptions* and other Things worth taking notice of.

Four *Miles* from *Spalato* is *Salona*, which ſhews the Ruins of a great Town. About as much farther from *Salona* ſtands *Cliſſa*, upon a rocky Hill, an eminent *Fortreſs* of the *Venetians*, which is here the *Frontier* againſt the *Turk*; from whence they repulſed him in their late Wars with great Honour. I was at *Leſina*, where is nothing very remarkable; but *Biondi*, that hath written our *Engliſh Hiſtory*, was of it. *Trau* is antient, and hath good Marks of its being ſo. Here I ſpoke with Dr. *Staſileo*, who put out that *Fragment* of *Petronius Arbiter*; and I ſaw his *Manuſcript*.

I was in the Harbour of *Raguſa*, but not in the *Town*. From hence we paſt the *Gulf* of *Budua*, and ſaw the Mountains of *Antivari*, the Plain of *Durazzo* and *Apollonia*, and came to *Saſſino*, a ſmall Iſland, from whence we could ſee the Town of *Valona*, and the Mountains *Acroceraunii*, which are very near, and are now called Mountains of *Chimæra*.

I ſtaid a Fortnight in *Corfu*, and had Time to view the Gardens of *Alcinous*, that is, the Place where they are ſuppoſed to have been, now called *Chryſida*, a moſt delicious Situation; the antient Port, now called Νικροθάλασσα, and ſeveral Foundations of antient Fabricks. In *Zante* I ſaw but little of *Antiquity*: What is modern is very flouriſhing, and the Iſland rich and plentiful.

I went from *Zante* to *Patras*, a Town in *Achaia*, of good Note among the Antients. Near it is a great Mountain, mentioned by *Homer*, by the Name of *Petra Olenia*. In the Town are ſeveral maſſive *Ruins*, which few there know how to give an Account of. There are the *Remains* of a large Church, dedicated to St. *Andrea*, who, they ſay, was *martyred* there. This is the firſt Town I ſaw on the Continent of *Greece*.

The Plain about it is very fruitful, full of Springs and Rivulets, finely wooded with *Olive Trees*, *Cypreſſes*, *Orange* and *Lemon Trees*. The *Citrons* here are counted amongſt the beſt of the *Turkiſh* Empire, and are ſent for Preſents to *Conſtantinople*. So are all their Fruits in very good Eſteem.

In *Athens* I have ſpent two Months. Next to *Rome* I judge it the moſt worthy to be ſeen for *Antiquities* of any I have yet been at. The *Temple* of *Minerva* is as intire as the *Rotunda*. I was three times in it, and took all the Dimenſions with what Exactneſs I could; but it is difficult, becauſe the *Caſtle* of *Athens*, in which it ſtands, is a Gariſon, and the *Turks* are jealous, and brutiſhly barbarous, if they take Notice that any meaſure it.
The *Length* of the *Cella*, or *Body* of the *Temple*,
Without-ſide is 168 } *Feet* } Theſe Meaſures you may rely on as exact
The Breadth — 71 } *Engliſh* } to ½ a *Foot*.

The *Portico* of the *Doric Order*, which runs round it, hath 8 *Pillars* in Front, 17 on the Sides; the *Length* of the *Portico* is 230 *Feet Engliſh*; the *Fuſte* or *Shaft* of the *Pillars* is 19 ½ *Feet* in Circumference; the *Intercolumnium*, 1 ¼ of the *Diameter* of the Pillars.

The *Temple* of *Theſeus* is likewiſe intire, but it is much leſs, though built after the ſame Model. The *Length* of its *Cella* is but 73 *Feet*, the *Breadth* 26. The whole *Length* of the *Portico*, which goes round it, 123 *Feet*. It is a *Doric* Building, as is that of *Minerva*. Both of them are of *white Marble*.

About the *Cornice*, on the Outſide of the *Temple* of *Minerva*, is a *Baſſo Relievo* of Men on Horſeback, others in Chariots; and a whole Proceſſion of People going to a Sacrifice, of very curious *Sculpture*. On the Front is the Hiſtory of the *Birth* of *Minerva*.

In the *Temple* of *Theſeus*, on the Front within-ſide the *Portico*, at the Weſt-end, is the *Battle* of the *Centaurs*; and at the Eaſt-end ſeems to be a Continuation of that Hiſtory. But there are ſeveral *Figures* of Women, which ſeem to be *Pirithous's Bride*, and thoſe other Ladies which were at the *Wedding*. On the Out-ſide the *Portico*, in the Spaces between the *Triglyphi*, are ſeveral of the Proweſſes of *Theſeus*, moſt in *Wreſtling* with ſeveral Perſons, in which he excelled: All his Poſtures and Looks are expreſſed with great Art. Others are *Monſters*, which he is made encountring with, as the *Bull* of *Marathon*, the *Bear* of *Calydon*, &c.

There is a *Temple* of *Hercules*, a round Fabrick, only of 6 *Feet* Diameter, but neat Architecture. The *Pillars* are of the *Corinthian Order*, which ſupport an *Architrave* and *Friſe*, wherein are done in *Relievo* the *Labours* of *Hercules*. The Top is but one Stone, wrought like a Shield, with a Flower on the Out-ſide, which riſes like a *Plume* of *Feathers*.

There is yet ſtanding the *Tower* of *Andronicus Cirrheſtes*, which is an *Octagon* with the *Figures* of 8 *Winds*, which are large, and of good Workmanſhip; and the *Names* of the *Winds* remain legible in fair *Greek* Characters (where a Houſe, which is built againſt it on one Side, does not hinder), as ἀπηλιώτης, εὖρος, βορέας, σκείρων, ζέφυρος, each *Wind* placed againſt its Quarter in the Heavens; and the Roof is made of little Planks of *Marble*, broad at Bottom, and which meet all in a Point at Top, and make an obtuſe *Pyramid* of ſome 32 or 36 Sides. There is a delicate *Temple* of the *Ionic Order* in the *Caſtle*, whether of *Pandroſos*, or whom, I cannot tell; but the Work was moſt fine, and all the Ornaments moſt accurately engraven.

The *Length* of this *Temple* was 67 } *Feet.*
The *Breadth* — — — 38 }

The *Pillars* which remain of a *Portico* of the Emperor *Adrian*, are very ſtately and noble: They are of the *Corinthian Order*, and above 52 *Feet* in *Height*, and 19 ½ in *Circumference*: They are *Cannellate*; and there are now ſtanding 17 of them, with part of their *Cornice* on the Top. The Building to which they belonged I meaſured the *Area* of, as near as I could conjecture, and found it near 1000 *Feet* in *Length*, and about 680 in *Breadth*.

Without the Town, the *Bridge* over the *Iliſſus* hath 3 *Arches* of ſolid Stone-work; the middlemoſt is near 20 *Feet* broad. There is the *Stadium* yet to be ſeen, whoſe *Length* I meaſured, and found it 630 *Feet*, near to what the preciſe Meaſure of a *Stadium* ought to be, *viz.* 625.

Towards the Southern Wall of the *Caſtle* there are the Remains of the *Theatre* of *Bacchus*, with the *Portico* of *Eumenes*, which is near it; the Semidiameter, which is the right Sign of the Semicircle which makes the *Theatre*, is about 150 *Feet*. The whole Body of the *Scene* 256. M. *de la Guilliotiere*, in that Book he hath written of *Athens*, hath made a Cut of a *Theatre*, which he calls that of *Bacchus*, which is a mere Fancy and Invention of his own, nothing like the natural one, which, by the Plan he has drawn of the Town, I judge he did not know.

Thebes is a large Town, but I found few *Antiquities* in it, excepting ſome *Inſcriptions* and *Fragments* of the *old Wall*, and one *Gate*, which, they ſay, was left by *Alexander*, when he demoliſhed the reſt. It is about 50 *Miles* diſtant from *Athens*, as I judge.

Corinth is two Days Journey diſtant; the *Caſtle*, or Ἀκροκόρινθος, is ſtanding, which is very large. The Main of the Town is demoliſhed, and the Houſes which now remain are ſcattered, and at a great Diſtance from one another. So is *Argos*, which to go round would be ſome 4 or 5 *Miles*, as the Houſes now ſtand; but if they ſtood together, they would ſcarce exceed a good Village. *Napolo della Rumilia* is a large Town, and full of Inhabitants, and the *Baſha* of the *Morea* reſides there: It is but a very few Leagues diſtant from *Argos*.

Sparta is quite forſaken; and *Meſtra* is the Town which is inhabited, 4 *Miles* diſtant from it. But one ſees great *Ruins* thereabout; almoſt all the *Walls*, ſeveral *Towers* and Foundations of *Temples* with *Pillars* and *Chapiters* demoliſhed: A *Theatre* pretty intire. It might have been anciently ſome 5 *Miles* in Compaſs, and about a *Quarter* of a *Mile* diſtant from the River *Eurotas*. The Plain of *Sparta* and of *Laconia* is very fruitful, and long, and well watered. It will be about 80 *Miles* in Length, as I judge.

The Mountains on the Weſt-ſide of it very high, the higheſt I have yet ſeen in *Greece*; the *Maniotes* inhabit them. But the Plain of *Calamatta*, which antiently was that of *Meſſene*, ſeems rather richer.

Corone is very abundant in *Olives*. *Navarrino*, which is eſteemed the antient *Pylos*, hath a very ſtrong *Caſtle* fortified by the *Turks*, and is the beſt *Port* in all the *Morea*. *Alpheus* is much the beſt *River*, and the deepeſt, and with great Reaſon extolled by all the antient Poets, and choſen for the Seat of the *Olympic Games*, for it is very pleaſant. The Plains of *Elis* are very goodly and large, fit to breathe Horſes in, and for Hunting; but not ſo fruitful as thoſe of *Argos* and *Meſſene*, which are all richer. The beſt Woods I ſaw in *Peloponneſus* are thoſe of *Achaia*, abounding with *Pines* and *wild Pear*, the *Ilex* and *Eſculus-Trees*, and, where there runs Water, with *Plane-Trees*.

Arcadia is a very goodly Champaign, and full of Cattle; but is all encompaſſed with Hills, which are very rough and unhewn. *Lepanto* is very pleaſantly ſeated on the Gulf, which runs up as far as *Corinth*; and without the Town is one of the fineſt Fountains I ſaw in *Greece*, very rich in Veins of Water, and ſhaded with huge *Plane-Trees*; not inferior in any thing to the Spring of *Caſtalia* on Mount *Parnaſſus*, which runs through *Delphos*, except in this, that one was choſen by the *Muſes*, and the other not, and poetical Fancies have given Immortality to the one, and never mentioned the other.

Delphos itſelf is very ſtrangely ſituated on a rugged Hill, to which you have an Aſcent of ſome 2 or 3 *Leagues*; and yet that is not a Quarter of the Way to come to the *Pike* of *Parnaſſus*, on the Side of which Hill it ſtands. It ſeems very barren to the Eye; but the Fruits are very good where there are any. The Wines are excellent, and the Plants and Simples which are found there very fragrant, and of great Efficacy.

About *Lebadia*, and all through *Bœotia*, the Plains are very fertile, and make Amends for the Barrenneſs of the Hills which encompaſs them; but in Winter they are apt to be overflown for that Reaſon, and to be turned into Lakes; which renders the *Bœotian* Air very thick, and ſo were their Sculls too, if the Antients may be believed concerning them; tho' *Pindar*, who was one that ſublimated *Poetry* to the higheſt Exaltation, and is much fanſied and imitated in our Age, as he was much admired in his own, was born there; and *Amphion*, who was ſaid to be ſo divine in his *Muſic*, that he raviſhed the very Stones, had Skill enough to intice them to make up the Walls of *Thebes*. So that not every thing that is born in a dull Air, is dull. Theſe Vales I found much planted with *Cotton*, and *Seſamum*, and *Cumin*, of which they make great Profit and a great Trade at *Thebes* and *Lebadia*.

I went from *Thebes* into the Iſland of *Eubœa*, or *Negropont*, and ſaw the *Euripus*, which ebbs and flows much after the Nature of our *Tides*; only the *Moon*, and ſometimes *Winds*, make it irregular. The Channel which runs between the Town, and a Caſtle which ſtands in an Iſland over-againſt it, is ſome 50 *Feet* broad, and there are 3 *Mills* on it, which ſhew all the Changes and Varieties that happen in the *Current*. Near the *Euri-*

Vide *Vol.* II. *Cap.* II. *Sect.* VIII.

pus, and oppoſite to the Town, they ſhew a *Port*, which, they ſay, was *Aulis*; and it is not improbable, for it muſt be thereabouts. Between *Negropont* and *Athens* is a high Hill, called Αγιομακέρι, formerly very dangerous, but now guarded by *Albaneſes*: It is Part of Mount *Parnaſſe*; and near it, on the Left-hand, lies Mount *Pentelicus*, from whence the *Athenians* antiently fetched their Stone, and now there is a Convent of *Calloiers* there, one of the richeſt of all *Greece*.

In going from *Athens* by Sea, I embarked in a Port which lies juſt by *Munichia*: That which they call *Porto Pyræo* lies behind it, a Mile diſtant, which is a large Port, able to contain 500 Veſſels. There are the Ruins of the Town yet remaining, and of the *Walls*, which joined it to the City of *Athens*. I ſailed by *Porto Phalero*, the antient Haven of *Athens*, which is rather a Road than a Port. I ſaw an Iſland called Φλέζε, where the *Athenians* had antiently *Mines*. I went aſhore on the Promontory of *Sunium*, to view the *Remains* of the *Temple* of *Minerva*, which ſtood on it. Hence I ſailed among the Iſles of the *Archipelago*, *Macroneſia*, *Thermea*, *Serphanto*, *Siphanto*, till I came to *Melo*. From *Melo* I ſailed through the *Cyclades* to come to *Smyrna*. I paſſed by *Andros*, *Tenos*, *Mycone*, *Delos*; *Naxia* and *Paros* I ſaw at a Diſtance. We ſailed near the Northern Cape of *Sio*, and the Southern of *Mitylene* or *Leſbos*, and ſo came into the Gulph of *Smyrna*. Within this Gulph ſtands *Burla*, near ſome ſmall Iſlands, which is judged to be the antient *Clazomenæ*; *Foja*, which is the ſame with the antient *Phocæa*: Near this the River *Hermus* diſcharges itſelf into this Gulf.

A Voyage from England *to* Conſtantinople; *by Dr.* Thomas Smith. *n.* 230. *p.* 527.

XXXIX. *Aug.* 3. 1668, we went on board the *Bezant* Yacht for the *Downs*, where we arrived the next Day in the Afternoon, and went on board the *Leopard* Frigate, Capt. *O Bryan* Commander, appointed to carry Sir *Daniel Harvey*, his Majeſty's Ambaſſador, to the *Port* of the *Ottoman Emperor* at *Conſtantinople*.

Aug. 9. We ſailed from the *Downs*, but were forced to an Anchor S. W. of the *South Foreland*: We carried a *Flag* upon our *Main-Top* after we came out of the *Downs*.

15. The Wind in the Afternoon at N. E. brought us by 7 of the Clock to the *Neſs*.

16. We were in the Morning athwart St. *Helen*'s *Point* in the Iſle of *Wight*.

17. In the Morning we got to the Weſt of *Portland*; but about Noon, ſailing over part of the *Race* of *Portland*, where we met with a tumbling Sea, we anchored at N. W. Part in the *Bay*, over-againſt the Point that looks towards *Weymouth*. We went aſhore in the *Iſland*, which ſeems to be but one continued *Rock*, the *Soil* in ſeveral Places not being above 5 or 6 *Inches* deep, as I found by digging a Hole with my Knife; yet the Corn flouriſhing enough. The *Caſtle* conſiſts of a double Fortification; we could not obſerve above 5 *Guns* mounted. They told us, that in the *Iſland* there was but one *Church* and 4 Villages. We weighed at 12 of the Clock at Night; but 18. the Wind blowing fiercely at W. we could not weather

ther the *Star Point* that Night. The Moon, upon its firſt emerging above the Horizon, ſeemed to have a Colour like burnt Brick, the Sky very cloudy; but ſome Rain falling, as ſhe advanced higher and higher, ſhe appeared more and more fiery.

19. We weathered the *Star Point* by Noon; and the 29th we got into *Plymouth Sound*. The *Citadel* is built upon a Rock, with large *Counterſcarps* and *Baſtions*.

20. We weighed out of *Plymouth Sound*, and made the *Lizard*, a Promontory in *Cornwall*, before Night: The *Manacles*, ſeveral Rocks ſo called, we diſcerned very diſtinctly, it being then Low-Ebb, as alſo the *Land's-End*. The Wind blew freſh; and we obſerved the Waves in the Night-time, as if they had been liquid Fire, but paliſh.

25. We were full open with the *Bay* of *Biſcay*. Several *Gulls* were hovering over the Surface of the Water, to catch Fiſh, which ſwam by in vaſt Shoals, at above 50 *Leagues* Diſtance from any Land. At other times I have ſeen ſeveral *Birds* floating upon the Water, which being driven by ſome Tempeſt from the Coaſt of *Spain* and *Portugal*, have been tired in their Flight, and ſo drowned. This happens frequently in the *Great Ocean*, where they meet with no Land to fly to in ſeveral *Hundred Leagues*; and ſometimes even in the *Mediterranean*, in the Mid-Seas between the *Chriſtian* and *Barbary Shores*. In blowing Weather, among other *Birds* flying croſs, we ſaw a *Hawk* making to our Ship, then under good and ſwift Sail, which perched upon the *Round-Top* of the *Main-Maſt*; which one of the Seamen eſpying, he preſently run up the Shrouds, and brought down the *Hawk*, which made no Attempt to fly away, being quite ſpent.

27. We found ourſelves, by our *Obſervations*, in the *Lat.* of 42 *Deg.* 17 *Min.* the Weather being exceſſive hot.

28. Dreadful Lightnings in the Clouds towards the Evening; after which great Dews fell; the Weather extreme hot.

30. This Morning we were ſurpriſed to ſee ourſelves within 4 or 5 *Leagues* of the Shore, when we thought that we had been above 20. In the Afternoon we weathered the weſtermoſt Iſle of the *Burlings*; on the greateſt of which, being, as we gueſſed, above *half* a *Mile* in Length, the *Portugueſe* have built a *Fort*, to hinder the *Barbary* Pirates from Careening their Ships there, or taking in freſh Water. The Land of it very high. By it lie ſeveral Rocks. The other Iſlands are diſtant about a *League*: I told 5 of them; the greateſt of which laſt lie ſomewhat inward to the Shore. For two Nights together, about this time (28 and 29) the Sky being very hazy, the Sun ſet in a Colour as *deep* as *Blood*, which was very aſtoniſhing. We were then in the *Lat.* of 40 *Deg.*

31. Betimes in the Morning we ſailed by the *Rock* of *Liſbon*.

Sept. 1. In the Morning we made *Cape St. Vincent*. All along the Coaſts, at the Diſtance of about 2 or 3 *Leagues*, are ſeveral *Watch-Towers* built to give Notice of *Pirates*.

5. In the Morning we weathered the Point of *Cadiz*, and came to an Anchor in the Bay of *Bulls*, about *half* a *League* from the great *Porgos*; and

in the Afternoon went on Shore. We were entertained by the *Engliſh Conſul*, and carried by him to view the *Fortifications*, which are eſteemed to be as regular as any in *Chriſtendom*, built in the ſame Place where the Town had been attacked formerly by the *Engliſh*, under the Conduct of the Earl of *Eſſex*, in the Reign of Queen *Elizabeth*. *Plays* are uſually here, as in other Parts of *Spain*, acted on a *Sunday*.

9. We ſailed from *Cadiz*.

10. This Afternoon we were forced to anchor, not far from Cape *Spartel*, or *Sprat*, as the Seamen call it, not being able to weather the Point.

11. This Day we came to an Anchor in *Tangier Bay*.

Tangier lies within the Entrance into the *Strait* of the *Mediterranean*, in the *Latitude* of about 35 *Deg*. 36 *Min*. It is ſituated in the Bottom of a Bay, and is built on the Side of a Hill, overlooking the Sea, encompaſſed with high *Walls* to the Land-ward, and commanded by a ſtrong *Caſtle*: The Heats would be very troubleſome, but for the *Sea-breezes*, which cool and fan the Air. In the *Caſtle* I met with a *Roman Monument*, erected to the Honour of *P. Beſius*, a great Officer and Soldier in *Trajan*'s Time, who, among his other Titles, is there ſtiled, PRO. FIG. MAURITANIAE TINGITANAE [which ſince has been taken away, and preſented to the Univerſity of *Oxon*, by Sir *Hugh Cholmondley*]. The *Engliſh* have two Churches here (though they only make uſe of one, the other being reſerved againſt all Accidents), both of them very neat and convenient, though not to be compared with the *Church* of the *Portugueſe*, retained ſtill (according to the Articles of Agreement when the King of *Portugal* made over the right Title, and gave the Poſſeſſion of *Tangier* to the Crown of *England*) by *Canons Regulars* belonging to it, which is very ſtately, and adorned with rich *Images*, and ſupported by *Marble Pillars*. Towards one End of the *Engliſh* Church, juſt by the *Veſtiary*, which had been formerly a *Turkiſh Moſque*, and afterwards the *Chapel* of a Convent of *Dominicans*, is a *Monumental Stone Table*, with *Arabic* Characters, containing an Account of the Houſes, Lands, and other Revenues belonging to it, ſet up in the 743d Year of the *Hegira*, that is, of *Chriſt* 1341. The *Mole* is in good Forwardneſs, they having gained above 200 Yards in the Sea, in order to the making a good and ſafe Harbour for Ships to ride in, which lie open to Wind and Waves, the outward Side to the Sea-ward ſomewhat ſloping. *Old Tangier* lies at ſome little Diſtance, where they find very frequently, in Digging, ſeveral Pieces of *Roman Coin*.

13. We weighed out of *Tangier*, and turned into the *Strait*, though againſt the Winds. The Diſtance between *Gibraltar* (which gives Name to the *Straits*, and is joined to the Continent of *Spain* by a narrow *Iſthmus*) and *Ceuta*, a well-built and ſtrongly fortified Town, lying under the Hill *Alybe*, called ſo by the *Greeks*, which the Seamen commonly call, as do ſome *Spaniſh* Writers, *Apes-Hill*, from the great Number of *Apes* which uſed formerly to haunt there (at which Places *Hercules* is feigned to have ſet up his *Pillars*), may be about ſix *Leagues*; though both Lands lying very high (for we ſaw the Clouds much below them) it does not ap-

pear in the Middle of the Current, out of a tall Ship, ſcarce half ſo broad.

15. A great Miſt all the Sea over, ſo that we could ſcarce ſee three Lengths of the Ship, which began to vaniſh in the Afternooon; and then we deſcried the Cape of *Malaga*, at about 4 *Leagues* Diſtance, and came to an Anchor that Night. This City lies under an high Hill, and is the Seat of a Biſhop, who is at this Time a natural Son of King *Philip* IV. of the Order of St. *Dominic*. Here the Merchants told us, that it had not *rained* for 7 *Months* together, except a Day or two for an Hour; and that the *Algerines*, who were then breaking with us, had not been able to have ſet a Fleet to Sea, if they had not been furniſhed with *Maſts* from *England*. I only make a Query, Whether *Jews* or *Engliſhmen* were the Freighters?

16. The next Morning we weighed from *Malaga* Road, the Weather very hot. In the Evening, the Sea being quiet, we ſaw a great Number of *Tortoiſes* ſwimming above Water, ſeveral *Bottle-noſes*, Fiſh of about 3 Yards long, and very thick, and *Hawks* flying over to the *Barbary* Coaſt. The Hills of *Granada* were ſeen plainly by us, though at a great Diſtance.

21. We paſſed by *Cape de Gata*; but the *Levant Wind* ſtill blowing, having continued almoſt in that Point for above 2 *Months*, as we computed from what they told us at *Tangier*, we could make but little Progreſs in our Voyage.

25. Between 3 and 4 of the Clock in the Morning the *Tornado's* began to blow, and the Wind violent for the Time, with ſuch continued Flaſhes of *Lightning* for ſeveral Hours, as that the whole Sky ſeemed to be on Fire, intermixed with terrible Claps of *Thunder*; after which followed great Showers of *Rain*.

28. We were athwart *Orlando*'s *Gap*, within 2 Leagues of the Shore, the Wind now ſtill, but a ſwelling Sea coming from the Weſtward; which is uſual before a Wind, which drives the Waters before it. On *Michaelmas* Day we were up with the Iſland *Ivica* or *Iviſe*, as the Mariners call it. The next Day at Noon we made the Iſland *Majorca*, ſituate over-againſt the Kingdom of *Valentia*, and came to an Anchor in a Bay of the City. In the Afternoon the Boat was ſent on Shore, but the *Vice-Roy* would not give us a *Prattick*, not bringing a Patent from *Malaga*.

Oct. 1. The Secretary was ſent with the King's Paſs to the *Vice-Roy* to demand *Prattick*, who preſently ſummoned the Officers of the *Sanità*. After long Debates and Delays they conſented, and came to the *Mole* to receive him; he went directly to the Governor, to acquaint him, that we were ready to *ſalute* the City with what Number of *Guns* he pleaſed, if he would engage, upon his Honour, to give us as many. He replied, that he would give us 3 for 5; and wondered that we, being but a ſingle Ship, ſhould make ſuch a Demand. The Secretary told him, that we were to be treated as an *Admiral*, having a *Flag* on our *Main-Top*, and that the Governor of *Malaga* had done it: To this he ſaid, that *Majorca* was a Kingdom, and that he was the King's Repreſentative, and that by reaſon of the Miſcarriage of his Predeceſſor, when Monſ. *de Beaufort*, the *French Admiral*, was there, he had received ſtrict Orders from *Madrid* not to do the like. The Secretary replied, that we had an Ambaſſador on Board, and had as ſtrict Orders, and ſhould anſwer as ſeverely for the Breach of them. His laſt Anſwer was, That we might, with our *Sails looſe*, keep before the Town till we had furniſhed ourſelves with what we wanted. Upon receiving this Meſſage, the *Ambaſſador* diſpatched away one *Joſeph Gabriel Cortez*, a *Spaniard*, but employed by the *Engliſh* Merchants trading to that Iſland, then on Board our Ship, to acquaint him, That when we were ready to go away, we would *looſe* our *Sails*, and not before. We landed within the *Mole*; the Walk upon it is about 4 or 5 *Yards* broad; at the Extremity of which is a very large and ſtately Gate, which leads into the City. We went into the *Great Church*, ſomewhat wider than *Weſtminſter Abbey*, but darkiſh within: The Portal very magnificent, adorned with ſeveral *Marble Statues* in *Niches*, one over another. The *High Altar* very plain, and unadorned: But others extraordinary rich and glorious. Not far from the City, are ſeveral Mills to grind their *Olives*, *Oil* being the great Commodity of the Iſland.

2. The next Morning we weighed, without taking any kind of Notice of the Town, ſailing all along in Sight of the Iſland, which preſented us with a pleaſant and delightful Proſpect; the Valleys, lying under the Hills, fruitful of Wine and Corn. The whole Iſland is judged to be about 60 *Leagues* in Compaſs, and in Length about 15. To the S. S. E. lie ſeveral little Iſlands, called the *Cabreras*; between which and *Majorca* we ſteered.

4. We were athwart *Port Maon* in *Minorca*, a fine level Country, having but one Hill in it.

5. We deſcried the Main-land of *Provence*.

6. We were over-againſt the Iſlands *Hieres*, and the High-land of *Thoulon*.

9. We were over-againſt the weſtermoſt Parts of the *Alps*, which we diſtinctly ſaw at about 20 *Leagues* Diſtance, and appeared far higher than the *Hills* of *Granada*.

12. We came, in the Morning, to an Anchor over-againſt the *Mole*, and not far from the *Lantern* in *Genoa*. Having obtained *Prattick* of the *Maeſtri della Sanità*, after a little Demur about the *Salute*, the Senate being aſſembled, and ſome of them proteſting upon their Honours, and ready to produce their Regiſters, that they never *ſaluted* the Ship wherein was an *Ambaſſador* of *France* or *Spain*, as not taking any Notice of the Perſon who did bear that Character, till they had firſt Intimation, that the Ship was arrived in their Port by its *ſaluting* the Town, it was agreed, that the Ship ſhould *ſalute* the Town with 11 *Guns*, which they were to *anſwer*, as they did, with an equal Number: And, after a little Pauſe, they *ſaluted* the *Ambaſſador* with 19 more, which were *anſwered* with as many. After this, the *Duke* and *Senate* ſent the Maſter of the Ceremonies to wait upon the *Ambaſſador*; who, going away, returned ſoon after with a Preſent of *Calves*,

Fowl, *Wine*, *Sweet-meats*, &c. and acquainted his Lordſhip, that they had deputed 6 of their Gentlemen to compliment him, and wait upon him; which Civility he thought fit to refuſe, deſiring to be *Incognito*. But however, going aſhore, he was welcomed by the *Illuſtriſſimi Signori*, the *Durazo*'s two Brothers, the Elder of which had been *Ambaſſador* for the *Republick* in the Court of *England*, and the other at *Conſtantinople*, and by them carried to ſee the *Villas* out of Town. The Figure of *Genoa* is ſemicircular, beginning from the *Lantern* weſtward, lying under an high Hill, upon the Riſing of which the ſeveral Houſes, built of *Marble*, afford a very fine Proſpect, and add much to the Beauty and Glory of the Place. *Strada Nuova* perchance is the moſt ſtately Street in the whole World. The *New Church* of the *Annunciata*, built by the *Lomellini*, for curious *Painting*, rich *Altars*, and Exactneſs of *Architecture*, is incomparable. The *Steps* which lead up to it are ſo many, and of ſo large a Compaſs, being ſemi-circular, that they may contain about 1000 upon them at the ſame Time. The *Duome* alſo, and the *Church* of the *Theatines*, are very ſtately and curious.

14. In the Evening we ſet Sail from *Genoa*.

18. In the Morning we made the Iſland *Gorgonia*, about 9 *Leagues* from *Livorne*, a little round Iſland, with a Caſtle on the Top.

19. In the Morning we came to Anchor in *Livorne Road*, about a *Mile* from the Town. The *Road* is large and ſecure, eſpecially to the Northward. The *Ambaſſador* kept on Board, the Governor refuſing to *ſalute* the Ship firſt, though he had formerly *ſaluted* the *French*; pretending that every Convoy might carry a *Flag*; and alledging, that his Maſter, the *Grand Duke*, was as great and abſolute as the *Republick* of *Genoa*, and that they had rather throw themſelves upon the King of *England*, than do a Thing which might prove of ſuch an ill Conſequence. Sir *John Finch* his Majeſty's *Reſident*, together with Sir *Thomas Baines*, came from *Florence* to compliment the *Ambaſſador*, and immediately diſpatched away a Courier to the *Grand Duke* about the *Salute*, who referred the whole Affair to the Governor; and he making a Proteſt, that he was ready to pay all the Reſpect which was due to the *Ambaſſador*'s Character and Quality, upon the forementioned Pretenſions, ſix Days after our Arrival, abſolutely refuſed to *ſalute* the Ship *firſt*.

Livorne is the great Magazine of Trade for the *Levant*, being a *free Port*; Merchants of all Countries reſiding here, *Armenians* eſpecially, and *Jews*, which latter enjoy great Privileges, without wearing any *diſtinct Mark* in their Hats or Habits, whereby they may be known. They are allowed the publick Exerciſe of their Religion: Their Synagogue large and handſome. The *Port* inward has a *Mole* for the *Duke's Galleys* and other ſmall Veſſels to ride in; the Entrance of which is chained up every Night. Hard by is the *Statue* of Duke *Ferdinand*, in *Marble*, raiſed upon an high *Pedeſtal*; under which are four Slaves, in *Braſs*, in different Poſtures, very large, and above the ordinary Proportion, but done with exquiſite and admirable Art. Two *Caſtles* to Sea-ward, well fortified;

the Town *Walls* very high, and the four *Gates* ſtrongly guarded: Below which is a *Ditch* of about 15 or 20 *Yards* over, and very deep. No Stranger is allowed to view the *Works*, nor Soldier permitted to come out of the *Caſtles*. About 4000 *Slaves* are there, as the Merchants told us, who are locked up in the *Bagno* every Night. The *Piazza*, where the Merchants meet, is adorned with *marble Pillars*, which ſuſtain the *Portico's*; at the Eaſt End of which is the *Great Church*, whoſe Roof appears very glorious, having ſeveral Circles richly *gilded*, and *painted* with curious *Figures*. The broad Street is paved between two and three *Yards* on each Side with *Free-ſtone*.

27. In the Afternoon we weighed out of *Livorne Road*.

29. We were forced back by contrary Winds.

30. We weighed a ſecond Time.

Nov. 5. At Evening we ſaw the *Eruptions* of *Fire* from *Stromboli*, which lies to the North-weſt of *Sicily*. Sometimes it flamed very *bright*, as a Bacon, at other Times there appeared only a glowing kind of *Light*, like that of an ordinary Star when the Air is thick and hazy. They ſay, that it *flames* moſt in rainy Weather.

6. In the Morning we were up within a *League* of it, and plainly perceived it to *ſmoke*. It is of a round Figure, and, as we gathered, may be about 3 or 4 *Miles* in Compaſs. Not far from it lie ſcattered ſeveral other Iſlands, called by the Antients *Æoliæ* and *Vulcaniæ*; among which are *Lipara*, a long flattiſh Iſland, and *Vulcannello*, which *ſmokes* moſt. This Afternoon we came to an Anchor in 8 Fathom Water, in the *Phare* of *Meſſina*, in the Mid-ſtream between *Scylla* and *Charibdis*; a violent Current ſetting againſt us, and the Wind not high enough, ſo as to be able to ſtem it. The Breadth of the Strait from *Meſſina* to *Rhegium* may be about a *League*. The Land is very high on the *Calabrian* Side, where are very ſteep Rocks, and great Depth of Water, above 150 *Fathom*, as they told us; but on the *Sicilian* Side, near the *Charibdis*, ſhole Water, and uſually an Eddy. On the Sandy Banks ſtands the *Phare*, or *Watch-Tower*. Several *Currents* meeting in this narrow Paſſage, cauſe a great *Ripling*, and the Waters are ſometimes carried N. and ſometimes S. The great Danger is, leſt the *Current* drive the Ship on either Side. We have had no *Lightening* for ſeven or eight Nights together.

7. We ſailed by *Ætna*, now called *Mongibel*, where the Sea widens 10 or 11 *Leagues* over. Now we ſee plainly the *Smoke* briſkly iſſuing out of the *Crater*, the *Limbus* of which was all black. The uppermoſt Part of the Mountain was covered with *Snow*, except ſome Streaks of *Aſhes*, as we judge, which lies as it were in a Gutter, ſpread here and there.

13. We were up with Cape *Modona*, the ſouthermoſt Cape of the *Morea*, and ſailed by *Coron*. The Land very high, the Hills of *Arcadia* lying Eaſtward from us: The Weather *exceſſive* hot at this Time, as it is in *England* at *Midſummer*.

14. In the Evening we ſailed between the Iſland of *Cerigo* and the *Main-Land* of *Greece*, it being about 3 *Leagues* over to *Cape Angelo*.

15. We entered the *Arches*, and ſteered through the *North Chanel*, leaving *Milo* and *Antimilo* on the Starboard Quarter, at ſome *Leagues* Diſtance.

16. Betimes in the Morning we were athwart *Negropont*, and ſailed between it and *Andros*. The *Bocca* lies S. W. and N. E.

17. We ſailed by *Chios*, or *Scio*, which is very mountainous towards the Middle. It is about 4 *Leagues* diſtant from Cape *Caraboroun*, or the Cape of the *Black Noſe*, as the *Turkiſh* Word ſignifies, which the Seamen, in their uſual Way of corrupting Names, call Cape *Jobbernoule*, the *Corinaeum* of the Antients, a Promontory of the famous Mountain *Mimas*, which runs along the Southern Side of the Bay of *Smyrna*.

18. We got into the Bay of *Smyrna*, and came to an Anchor without the Caſtle, not far from St. *Jacomo's Point*, as the Seamen call it, or rather *Sangiac Point*. In the Evening we heard a great Howling of *Jacalls* upon the Hills.

20. The *Conſul* with the *Nation*, accompanied with his *Drugger-Men* and *Janizaries*, in their Habits, together with ſeveral *French*, *Dutch* and *Genoeſe* Merchants, reſiding in that famous *Emporium*, came to the Village near the Caſtle, who there expected us with Horſes. Upon our going Aſhore the *Leopard* fired 51 Guns. We made about 140 Horſe; and immediately upon our ſetting forth we rode, for about 3 Miles together, under the Hill, to the S. W. of *Smyrna*, the Places adjoining ſet thick with *Olive*, *Fig*, and *Almond* Trees. Afterwards we clambered over ſome rocky Aſcents, but the Horſes of the Country being ſure-footed, we were in no Danger of falling. Some little Way we were forced to ride on the Sea-ſhore, and ſoon after came to the *Jews Burying-place*, whoſe *Monuments* lie flat upon the Ground. As ſoon as we entered into the City, we found the Streets full of *Greeks*, *Armenians*, *Turks*, and *Jews*, whom Curioſity had drawn together to ſee and obſerve our *Cavalcade*; the *Engliſh* Ships, which were in the Bay, firing their Guns as we paſſed near the Shore: And after 3 Hours riding the *Ambaſſador* was brought to the *Conſul*'s Houſe, where Lodgings were provided for him.

Dec. 8. We took our Leave of *Smyrna*, being accompanied by the *Conſul* and Merchants on Board the *London Merchant*, Capt. *John Hill* Commander, the *Leopard* being ordered to go no farther than *Smyrna*, it being feared in *England*, that if ſhe had ſailed up to *Conſtantinople*, the *Turks* might have preſſed her for their Service in *Candia*, which they were then beſieging.

20. We ſailed between *Scio* and *Mitylene*.

21. We paſſed by *Lemnos*, and were up with the Iſland *Tenedos*, a fine Champaign Country, only with one Hill toward the Middle of it. The Caſtle to the N. E. Part of the Iſle; over-againſt which lie three ſmall Iſlands in ſtrait Line. Here we came to an Anchor. We ſaw the Ruins of *Troas* at a Diſtance.

22. We entered the *Helleſpont*, which may be about 2 *Leagues* and an *half* over. The *Caſtles* built upon the oppoſite Points of Land, about 11 or 12 *Years* before, after the great Defeat given the *Turkiſh Armata*, at the *Dardanels*, by the *Venetians*; Cape *Janizary* on the *Aſian* Side; which, with the *Philæum*, makes a tolerable good *Bay* for ordinary Veſſels. The *Narroweſt Strait* of the *Helleſpont* is at the two other *Caſtles*, Diſtance about 6 *Leagues*, where it may be about a *quarter* of a *Mile* wide. Theſe the *Chriſtians* call the *Dardanelli*; at which are ſituate the Towns *Seſtus* and *Abydus*, famous in *Greek Poeſy* Theſe *Caſtles* we *ſaluted* with our Guns and Trumpets, as we did the firſt; but each, whether out of Pride, or out of Covetouſneſs to ſave the *Grand Signior*'s Powder, returned us no more than 2 *Guns*. The Wind blowing very fair, we ſailed into the *Propontis*.

23. We paſſed by St. *Stephano's Point*, where we had a full View of the S. E. Angle of *Conſtantinople*, which, being ſituated upon ſeveral Hills to a mighty Advantage, what with the *Cypreſs* Trees intermixed, and what with the *gilded Spires* of the *Moſques*, yielded us a very diverting and glorious Proſpect. Paſſing by the *Seraglio Point*, which we *ſaluted* by a Diſcharge of ſeveral *Guns*, in the Mid-Stream, between it and *Tophana*, we came to an Anchor.

26. On St. *Stephen*'s Day the *Ambaſſador* landed at *Galata* (having before been viſited by the Earl of *Winchelſea*, and the Merchants reſiding there), and was received there by the *Chiaus Baſhi* and the *Vaivod* of *Galata*, the *Janizaries* and *Chiauſes* attending, and was waited upon by them to his Palace. And ſoon after the *Kaimacam*, or Governor of *Conſtantinople*, ſent an Officer to compliment him upon his Arrival, the *Grand Signior* being then at *Lariſſa* in *Theſſaly*.

Jan. 2. The *Ambaſſadors*, old and new, went over to *Conſtantinople*, that Morning being aſſigned by the *Kaimacam* to give them Audience; the *Chiaus Baſhi*, and other Officers, attending at the Water-ſide to receive them, Horſes being brought thither for them and their Followers to mount. This *Kaimacam Juſuph*, a little old Man, had formerly been a Page of the Chamber, and Chief Falconer, and afterward *Baſha* of *Siliſtria*. He entertained the *Ambaſſadors*, and their Company, with Perfumes, Coffee, and Sherbet, and diſtributed about 15 *Koſtans*, or Veſts, among them: After about an Hours Stay they took their Leave.

Being upon the Coaſts of *Greece*, about *Aug.* or *Sept.* 1671, in the *Lat.* of 35 *Deg.* 33 *Min.* we found by our *Azimuth-Compaſs*, that we had *Weſterly Variation* there 5 *Deg.* 22 *Min.*

The *Variety* of *Colours* of the *Sea-Water* at ſeveral times chiefly depends upon the Wind and Weather, and the Reflexion of Light upon it. Its uſual and moſt natural Colour is a *deep Green*; but in cloudy and rainy Weather, the Surface of the Water appears *blackiſh*. Sometimes the Water is of a perfect *Azure Colour*, as we have obſerved for ſeveral Weeks in the *Mediterranean*. The Sun ſhining bright upon the Water, ſometimes the upper Part of the Wave appears *purpliſh*, ſometimes *reddiſh*, though in Shallows, perchance, it may receive this latter Tincture alſo from the Sands which lie under it. When the Wind has freſhened, and the Ship has been under full Sail, I have obſerved the Waves, at the Head and at the Sides of the Ship, to appear with a *pale kind of Brightneſs*; which I aſcribe rather to the *Saline* Particles of the *Sea-Water*, which were then put into a violent Agitation, than to the *Spawn of Fiſh*, as ſome of our Company imagined.

Sailing toward the Weſt of *Portland*, we ſaw ſeveral *Porpus's* playing with their Heads above Water; which I mention only, becauſe the Seamen look upon them as Fore-runners of a Storm; the Wind ſoon after blowing very hard at N. by E. and afrerwards arriving at *Conſtantinople*, the Wind blowing a ſtiff Gale at North, I obſerved, with a pleaſant kind of Aſtoniſhment, good part of the *Propontis*, that is, from *Seraglio Point* toward the Iſlands, which lie againſt the *Bay* of *Nicomedia*, Eaſtward and South-Eaſt from us, as far as we could ſee, covered as it were with *Porpus's*, which appeared every where in great abundance. So that I am very apt to believe, that *Julius Solinus* is to be underſtood of *Porpus's*, and not of *Dolphins*, now properly ſo called, though that be his Word, ſpeaking of the *Boſphorus* and *Propontis*: *Hæc profunda* Delphinas *plurimos habent*: And ſoon after, *ante omnia nihil Velocius habent Maria, ſic ut plerumque tranſvolent vela Navium.* And I could not hear that any *Dolphins* are caught in thoſe Seas by the *Greeks*, whoſe Poverty, added to the Love which their Nation has for *Fiſh*, and the Advantage ariſing thence, upon the Account of their ſolemn *Faſts* and *Abſtinences* from all *Fleſh*, even to a wonderful Strictneſs and Scrupuloſity, has made them excellent Fiſhermen.

Polyhiſtor. Cap. 12.

2. *Conſtantinople*, formerly *Byzantium*, was by *Conſtantine* the *Great* called ſo after his own Name; who being mightily pleaſed with the beautiful and advantageous Situation of the Place between two Seas, and defended by narrow Straits on both Sides, removed the *Seat* of the *Empire* hither, and laid the Foundation of its future Splendor and Greatneſs. It was alſo by a ſpecial *Edict*, or Law, of the ſame Emperor, which he cauſed to be engraven on a *Marble Pillar*, placed near his own Statue on Horſeback, in one of the Piazza's of his new-built City, called *Strategium*, where the Soldiers uſed to muſter, as in the *Campus Martius*, called *Second* or *New Rome*, in Emulation of *Old Rome*, which he deſigned and endeavoured this ſhould equal in all things. Accordingly he endowed it with the ſame *Privileges* and *Immunities*, and eſtabliſhed the ſame Number of *Magiſtrates* and Orders of People, and divided the whole Extent of it into 14 *Precincts* or *Regions*, according to the Diviſion of *Rome*. And the *Greek* Writers were as elegant and extravagant in their Commendations of it; but the uſual Title in their ordinary Diſcourſes and Writings, when they had Occaſion to mention it without any Flouriſh, was, ἡ βασιλεύουσα, or ἡ βασιλὶς· that is, the *Imperial City*, to the ſame Senſe with that of *Sidonius Apollinaris*;

Hiſtorical Obſervations relating to Conſtantinople; *by Dr.* Tho. Smith. *n.* 152. *p.* 335.

Euſeb. *de Vita* Conſtantini.

Socrat.

In Panegyr.

Salve, Sceptrorum Columen, Regina Orientis
Orbis, Roma, tui.

The Country about it was afterwards called *Romania* in a limited and reſtrained Senſe (for that *Romania* was antiently the ſame with *Orbis Romanus*, ſeems clear from *Epiphanius)*, and the People Ῥωμαῖοι. But I ſuppoſe this was done till about the Middle Times of the Empire, when it began to decline. The *Greeks* ſtill retain the Name: For if you aſk any of the *Greeks*, born upon the Continent of *Thrace*, what Countryman he is? he anſwers forthwith, Ῥωμαῖος, *Romios*; for ſo they pronounce it. The *Turks* in like manner call a *Greek Chriſtian Urum Gracur*, or the *Roman* Infidel, as they will call ſometimes the *Emperor* of *Germany*, *Uramler Padiſha*, or the *Emperor* of the *Romans*. Hence it was that the latter *Grecian* Emperors ſtiled themſelves Βασιλεῖς Ῥωμαίων, Kings of the *Romans*; that is, ſuch as were born in *Romania*, and the other Countries, which made up the *Eaſtern Diviſion* of the *Empire*. Though perchance by this flouriſhing Title they pretended a Right to the Government of the *Weſt*: Upon which vain Preſumption they aſſumed alſo the Title of Κοσμοκράτορες, or *Emperors of the World*, as if they had been the true Succeſſors of *Auguſtus*, and the *Weſtern Emperors* Uſurpers, whom they called, by way of Contempt and Indignation, Ῥῆγες, *Reges*, as *Luitprandus* informs us, in the Account of his Embaſſy to *Nicephorus Phocas*, and afforded the People of *Italy* no other Title than that of *Longobards*, or *Lombards*. The *preſent Greeks* call all the *Weſtern* Chriſtians Λατῖνοι or Φράγγοι, *Latins* or *Franks*; the *Turks* only make uſe of the latter, when they ſpeak civilly of us, and calling *Chriſtendom Phrenkiſtan*, in the *preſent Greek* Φραγγία. The *Turks* now as proudly call *Conſtantinople Alempena*, or the Refuge of the World; where indeed ſeems to be a Medley of all or moſt Nations of 3 Parts of it, and of all Religions; which are allowed to be publickly profeſs'd and exerciſed every where throughout the Empire, except the *Perſian*. For they look upon it as a Corruption of, and Deviation from the Rules and Doctrine of *Mahomet*, their great falſe Prophet; and therefore abſolutely forbid it as repugnant to, and deſtructive of the Doctrine of Life and Salvation, as they ſpeak. And accordingly they condemn with all imaginable Fury the Profeſſors of it, who pretend to follow *Ali*, as *Sectaries* and *Apoſtates*, and entertain worſe Opinions of them than of *Chriſtians* or *Jews*, or *Infidels*. The *Perſians* are not behind-hand with them in their Hatred and Diſreſpect, deriding them as groſs and ſtupid, and looking upon them as little leſs than barbarous; Intereſt and Zeal for their ſeveral Tenets heightening their Differences ſo much, that in Time of War they deſtroy one another's *Moſchs*. I remember that there was a great Diſcourſe in *Conſtantinople* among the *Turks* concerning an impudent hot-headed *Perſian*, who publickly, in the *New Moſch* built by the *Mother* of the preſent *Emperor*, aſſerted, That *Ali* was equal to *Mahomet*. But it ſeems he very luckily made his Eſcape out of their Hands; at which the Prieſts, and the more zealous *Turks*, were very much ſcandalized.

Hæreſi. 69. Sect. 2.

The *Greeks* have 26 *Churches* within the Walls of the City, beſides 6 in *Galata*, of which I have given an Account elſewhere. They have alſo 2 *Churches* at *Scutari*, 1 at *Kadikui* or *Chalcedon*. So at *Stauroſis*, *Chin-*

gilkui, and ſeveral other Villages upon the *Aſian* Shore of the *Boſphorus*, as at *Beskitaſh*, *Ortakui*, *Cherouch Cheſme*, which *Church* is dedicated to St. *Michael the Archangel*, *Jenikui* or *Neochorion*, *Therapia*, *Bujukdere*, and other Villages on the *European* Side. They have alſo a *Church* at *Haskut*, where is their *Burying-place*, and another near the *Bagno*, dedicated to Saint *Paraſceve*. And at *Tatoula*, about a Mile from *Pera*, upon a Hill, which from the Name of the *Church* is thence called by the *Greeks* and *Franks*, St. *Demetrius*'s *Hill*. Next to the *Holy Virgin*, St. *Demetrius* and St. *George* have moſt *Churches* dedicated to them.

The *Armenians* have not, if I remember aright, above 7 *Churches*; they being few in Number in Compariſon of the *Greeks*.

The *Jews* may have in the City and Places adjacent between 20 and 30 *Synagogues*, this being the greateſt Shelter of that accurſed and contemptible People in the *Grand Signior*'s Dominions, next to *Caire* and *Saloniki*; and I believe there may be about 20 or 30,000 Families of them. They are of great Uſe and Service to the *Turks*, upon account of their Brokage and Merchandize, and Induſtry in ſeveral Mechanical Trades. All theſe I look upon as Natives, or Slaves rather, each paying Money for his Head every Year. Theſe *Jews* indeed very wiſely collect this Tax among themſelves, and, according to an Agreement made with the *Teſterdar*, or *Treaſurer*, pay a certain Sum in groſs for their whole Nation reſiding there; by which Piece of Cunning they are great Gainers, and ſpare the Poor among them, leſs able to pay, by a Contribution of the Rich to make up the Sum. The *Engliſh* and *Dutch Embaſſadors* have their Chapels in their Palaces common to their reſpective Nations.

The *Churches* and *Chapels* of the *Weſtern Chriſtians* of the *Roman Communion* in *Galata*, are,

St. *Peter*'s, belonging to the *Dominicans*, where is the famous Piece of *Madonna di Conſtantinopoli*, as the *Italians* call it, or of the *Bleſſed Virgin*, holding the *holy Child Jeſus* in her Arms; which they pretend to be drawn by the Hand of St. *Luke*, celebrated by ſome of the latter *Eccleſiaſtical* Writers to have been a famous Painter. Out of Reſpect to this idle Tradition, the credulous and ſuperſtitious *Latins* and *Greeks* of the *Roman Communion* ſhew great Veneration to it, which otherwiſe hath little in it of Proportion, Art, or Beauty, to derive any Reputation upon the Deſigner, or upon his Work.

St. *Francis*, belonging to the *Conventual* Friers of the Order of St. *Francis*: The Ground of this, by the wiſe Conduct and Interceſſion of Cavalier *Molino*, the *Venetian Bailo*, after the Surrendry of *Candia*, upon the Peace made by the *Republick* with the *Grand Signior*, was procured to be reſtored, and a handſome *Church* rebuilt with the large Contributions of Money ſent out of *Chriſtendom*.

St. *Benedict*, belonging to the *Jeſuits*, where is a rich Altar, curiouſly adorned with ſeveral Figures in *Moſaick*. This *Convent* was purchaſed for them by their great Benefactor *Henry* IV. of *France*.

St. *Mary*, belonging to the *Obſervantines*, or *Zoccollanti*, a Branch of the *Order* of St. *Francis*, ſo called from their going in *Zoccoli*, or *Wooden Clogs*.

The *Capuchins* have a little *Chapel* dedicated to St. *George*, hard by the *French Ambaſſador's* Palace.

St. *Anne*, a *Chapel* frequented by the *Pierots*.

St. *Paul* and St. *Anthony* were both taken away ſome Years ſince from the *Chriſtians*, and turned into *Moſchs*: The former of which is now known by the Name of *Arab Giameſi*, or the *Moſch* of the *Arabians*. Our Interpreters mentioned alſo to me the *Church* of St. *John*, which the *Turks* have ſeized upon for their Uſe; St. *George*, which the *Jews* are poſſeſſed of; and St. *Sebaſtian*, which was uſed to be viſited chiefly on *Holy-Days*.

The North Wind blows for the moſt part at *Conſtantinople*, which muſt be aſcribed to its Nearneſs to the *Euxine Sea*, which bears that Point from it. So that for want of Southerly Winds, Ships have been forced to lie a Month or Two ſometimes near the Mouth of the *Helleſpont*. This was taken notice of long ſince by *Eunapius*, in the Life of *Ædeſius*, who aſcribes the ſeldom blowing of the South Wind to the Situation of the Mountains; whereas it is checked and over powered by the Exuberance of the Vapours continually ſent forth from the *Black* and *Great Sea*, as the *Greeks* call it in Compariſon of the *Mediterranean*.

Condini de Orig. Conſtantinop.

The *Helleſpont* is about 40 *Miles* in Length; and at the *Caſtles* of *Seſtos* and *Abydos* the Strait may be about three Quarters of an *Engliſh Mile* over, or leſs.

The Length of the *Propontis* is about 150 *Miles*; both Shores may be ſeen in the Middle of it. In it are,

Cyzicus, an Iſland near the *Aſian* Shore, to which it is joined by Two Bridges. It ſtill retains its antient Name Κυζικὸ, and is the Seat of a Biſhop; being inhabited by a conſiderable Number of *Greeks*.

Proconneſus, not far from the former; now, as for ſome Centuries paſt, called *Marmora*, from the excellent Quarries of *Marble* there found, the *Marmor Cyzenicum* alſo being famous in the Time of *Pliny*.

Besbycus, now called by the *Greeks* Καλὸλιμνο, or the *Good Haven*, not far from the Entrance into the Bay of *Montanea*, to the N. by E. The *Turks* call it *Imramle*.

There are ſeveral Iſlands over-againſt the Bay of *Nicomedia*, formerly called *Sinus Aſtacenus*, according to *Strabo*, about 6 or 7 *Leagues* from *Conſtantinople*.

Prote, ſo called, becauſe they approach firſt to it, coming from *Conſtantinople*; to the South of this *Prencipe* and *Pytis*, which I take to be the ſame with *Pyrgos*, that lies inmoſt toward the Bay; *Chalcitis*, in modern *Greek*, *Chalce* or *Chalcis*; *Oxia* and *Platy*, to the North-Weſt.

The *Seraglio* is at the extreme Point of the North-Eaſt Angle of *Conſtantinople*, where formerly ſtood *Old Byzantium*, within which, toward the Haven, is a ſtately *Kiosk*, or Summer-houſe, from whence the *Grand Signior* uſually takes Barge when he paſſes into *Aſia*, or diverts himſelf upon the *Boſphorus*, at which Time the *Boſtangi Baſhi*, who hath the principal Care of the Emperor's Palace, and hath the Command of the *Boſphorus*, ſits at the Helm, and ſteers.

The 7 Towers are the South-Eaſt Extremity.

The only Suburbs are to the North-Weſt, along the Haven Side; for above the Hill, where the 3 Walls begin, lies an open Champaign Country, except that here and there, at conſiderable Diſtances, Farm-houſes are ſcattered.

The Haven runs in from the Weſt, and ſo opens Eaſt.

At the Eaſt end of *Galata* is *Topbana*, where they caſt their Great Guns.

Pera and *Galata* have about 6 Gates to the Sea-ward. The whole Tract of Ground was antiently, before the Times of the Emperor *Valentinian*, who incloſed and fortified *Gelata* with Walls and Towers, ſtyled Περαῖα, or *Regio Peræa*, being περαν τῆς πόλεως, on the other Side of the City towards the North, which is the Reaſon of its Name, ſeated on higher Hills, and whoſe Aſcent is moſt ſteep and difficult.

Our modern Geographers, ſuch as *Mercator* and *Ortelius*, who herein follow *Ptolemy*, place *Conſtantinople* in the Lat. of 43 Deg. and 5 Min. the *Arabian* and *Perſian* Aſtronomers, as *Abulfeda*, *Naſſir Eddin*, *Ulugh Beigh*, and ſo the πρόχειροι κανόνες of *Chryſococcus*, tranſlated out of the *Perſian* Tables, place it more Northerly in 45 Deg. but by latter and better Obſervation it is found, that they have erred in aſſigning the Lat. of this City, as of ſeveral other Places. To ſalve theſe Differences, there is no juſt Ground of Pretence to ſay, that the Poles are moveable, and have changed their Situation ſince their Time; whereas it may better be imputed to their Want of due Care, or to their taking Things upon Truſt, from the Reports of Travellers and Seamen, not having been upon the Places themſelves; which is certainly to be ſaid for *Ptolemy*, whoſe Obſervations, as to Places more remote from *Alexandria*, are far from being accurate and true. The learned Mr. *John Greaves* took the Height of the Pole at *Conſtantinople*, with a braſs Sextant of above 4 Feet Radius, and found it to be but 41 Deg. 6 Min. But by the Obſervation we made in our Court-yard at *Pera*, with a very good Quadrant, we found it but 40 Deg. and 58 Min.

Vid. *Vol.* I. *Cap.* VII. *Sect.* XXV.

There is no Space between the *Propontis* and the Walls of the City, except juſt at the *Seraglio Point*, which may be 200 Paces in Length; where they have raiſed, on a Platform, a Battery for great Guns; but from the Point to the End of the Haven Weſt, the Space to the Gates is unequal; in ſome Places about 20 Paces broad, in others 3 or 4 times as many more.

The Diſtance between *Conſtantinople* and *Chalcedon*, upon the oppoſite *Bithynian* Shore, may be about 3 or 4 Miles.

In the Walls are engraven the Names of ſeveral Emperors, who reigned about the Declenſion of the *Grecian* Empire, as *Theophilus*, *Michael*, *Baſilius*, *Conſtantinus Porphyrogenitus*, by whoſe Care, and at whoſe Expence, the ſeveral Breaches, cauſed in them by Sea, or by Earthquakes, were repaired.

Kumkapi, or the *Sand-gate*, lies toward the *Propontis*: This the *Greeks* call in their vulgar Language, Κονδοσκάλι, *Contoſcalium*, or the *little Scale*, or *Landing-place*. Here formerly was an Arſenal for Galleys, and other ſmall Veſſels, it being a convenient Paſſage over Sea. Over this Gate was antiently engraven a curious Inſcription ſtill preſerved in that excellent Collection publiſhed by *Gruterus*.

Jedicula Kapi, or the Gate of the 7 Towers, ſo called from its Nearneſs to that *Acropolis*, is that, I gueſs, which the *Greeks* formerly called χρυσῆ, or the *Golden Gate*, and by ſome late *Latin* Writers *Chryſea*; in *Luitprandus*, *Carea*, by a Miſtake either of the Tranſcriber or Printer, for *Aurea*; for ſo certainly it muſt be mended. Over this Gate was this Inſcription:

Hæc loca Theodoſius *Decorat poſt fata Tyranni,*
Aurea Secla gerit, qui Portam conſtruit Auro.

cited by *Sirmond*, in his Notes upon *Sidonius*. This Gate is in the 12th Region, and was alſo called ὡραῖα, from its beautiful and curious Structure.

The *Gun-gate*, formerly called *Roman-gate*, not becauſe it leads towards the Continent of *Romania* of *Thrace*, but from St. *Romanus*, where the laſt Chriſtian Emperor was killed at the Aſſault, which the *Turks* made to force their Way into the City by it.

Near *Adrianople-gate*, is a fair large Moſch, called *Ali-baſſa*, upon a Hill accounted the higheſt in the City.

The Diſtance between Tower and Tower in the upper Wall to the Landward may be about 90 of my Paces; the Space between that and the ſecond Wall about 18 Paces over.

The Palace where the Lions, Leopards, and ſuch like wild Creatures are kept (where I ſaw alſo ſeveral Jackals) was formerly, as the *Greeks* told me, a Chriſtian Church dedicated to Παναγία, or the Bleſſed Virgin, where this Verſe is ſtill legible.

Κατὰ Σκυθῶν ἐπνδύσας θερμὸν ἐν μάχαις.

There is no Tide or Running-back of the Water on any Side of the *Boſphorus* into the *Black-ſea*, as ſome have imagined, whoſe Miſtake might poſſibly ariſe hence, that the Wind being at North, and blowing hard, the Current ſets more violently at ſuch Times againſt the ſeveral Head Lands, jetting out into the Chanel, which admits of ſeveral Turnings, and ſo the Waters are forced back to ſome little Diſtance; or elſe becauſe when the South Wind freſhens and grows boiſterous, it makes a high rolling Sea in *Propontis* and *Boſphorus*, and being contrary to the Current, gives a Check to it; ſo that it becomes leſs ſenſible, and is eaſily ſtemmed. Where it is narroweſt, the Diſtance ſeems to the Eye to be ſcarce a Mile over from one Shore to another; where broadeſt, not much above a Mile and a half, unleſs

leſs where it runs into the deep Bays, which, by Reaſon of their Shallowneſs, only harbour Boats.

The Chanel certainly is natural, and not cut by Art, as ſome have idly fancied, not conſidering how the *Euxine Sea* ſhould diſcharge itſelf otherwiſe of thoſe great Quantities of Waters poured into it by the *Iſter* and *Tanais*, now called *Don*, and the other Rivers, whereby it becomes leſs ſalt, even very ſenſibly to the Taſte, than ſeveral Parts of the *Mediterranean*.

The Fiſh, by a ſtrange kind of Inſtinct, paſs in vaſt Shoals twice a Year, Autumn and Spring, through the *Boſphorus*, that is, out of one Sea into another; of which the *Greeks*, who live ſeveral Months of the Year upon them, take great Numbers, and ſupply the Markets at eaſy Rates; the Cormorants, and other ravenous Water-fowl, which the *Turks* will not ſuffer to be deſtroyed, or otherwiſe moleſted, preying alſo upon them.

The Weather in ſome Months is very inconſtant, great Heats and Colds happening the ſame Day upon the Change of the Wind.

The Winters at *Conſtantinople* are ſometimes extraordinary ſevere. I have heard it related by ſeveral old *Greeks*, as a thing moſt certain, that the *Boſphorus* was frozen over in the Time of *Achmed*, and that a Hare was courſed over it. It happened thus: That, upon a Thaw, huge Cakes of Ice came floating down the *Danube* into the *Black-Sea*, and were driven by the Current into the *Boſphorus*, where, upon the Return of the Froſt, they were fixed ſo hard, that it became paſſable. In the Year 1669. there was Ice in the Haven, to the great Amazement of the *Turks*; and ſome were ſo frighted at this unuſual Accident, that they looked upon it as a diſmal Prodigy, and concluded that the World would be at an End that Year.

The *Aguglia* or *Obelisk* in the *Hippodrome*, is betwixt 50 and 60 Feet high.

The Hiſtorical Pillar in *Baſſo Relievo*, raiſed in Honour of the Emperors *Arcadius* and *Honorius*, may be in Height about 147 Feet.

Alexius Comnenus lies buried in the Patriarchal Church againſt the Wall, and his Daughter *Anna Comnena*, the Hiſtorian, who lived about the Year of Chriſt 1117. They pretend to ſhew there the Reliques of St. *Anaſtaſia*, who ſuffered *Martyrdom* under the Emperor *Valerianus*, and of St. *Euphemia*, Virgin and Martyr, who loſt her Life moſt gloriouſly, for Chriſt's holy Religion, at *Chalcedon*, under *Diocleſian*.

In *Sancta Sophia* there are Pillars ſo great, that a Man can ſcarce fathom them at twice. At the End of the Gallery, that joins the other Two, each about 30 of my Paces wide, there is a Piece of tranſparent Marble Two or Three Inches thick. In the North Gallery, upon the Pavement, is a reddiſh Sort of marble Stone, brought, as the *Turks* and *Chriſtians* relate, from *Paleſtine*, on which they fable, that the Bleſſed Virgin uſed to waſh the Linen of our Saviour.

I obſerved but one Step from the Body of the Church to the *Bema*, or Place where the Altar formerly ſtood.

The great Moſch at *Chaſim-Baſſa*, on *Pera* Side to the Weſt, was formerly a Church dedicated to St. *Theodoſia*.

Gianghir, a Moſch ſo called, upon a Hill at *Fondaclee* near *Tophana*.

In *Conſtantinople* there are ſeveral narrow Streets of Trade, cloſed up with Sheds and Pent-houſes; which I ſuppoſe were in Uſe before the *Greeks* loſt their Empire, and are the ſame with the σκεπαστοὶ καὶ φρακτοὶ δρόμοι in *Chryſaloras*'s Epiſtle. But beſides theſe Places, ſeveral Trades have their diſtinct Quarters. The Streets are raiſed, for the moſt part, on each Side, for the greater Convenience.

Not far from *Suleimania* is the Houſe of the Aga or General of the *Janizaries*, which ſo often changes its Maſters.

Pompey's *Pillar*, as the *Franks* erroneouſly call it, is of the *Corinthian* Order, curiouſly wrought, about 18 Foot in Height, and 3 in Diameter.

Beſhiktaſh, a Village within Two or Three Miles of *Conſtantinople*, towards the *Boſphorus*, where lies buried the famous Pirate *Ariadin*, whom the Chriſtian Writers call *Barbaroſſa*, who built here a handſome Moſch, having Two Rows of Pillars at the Entrance. The Captain Baſſa uſually, before he puts to Sea with his *Armata* or *Galleys*, viſits the Tomb of this fortunate Robber, who had made ſeveral Thouſand Chriſtian Slaves, and makes his Prayers at the neighbouring Church for the good Succeſs of his Expedition.

They reckon in the City above 100 publick Baths, every Street almoſt affording one. They are eſteemed Works of great Piety and Charity, there being a continual Uſe of them, not upon the Account of Religion, but of Health and Cleanlineſs: For their Diet being for the moſt part hot ſpiced Meats in Winter, and crude Fruits in the Summer, their Liquor, Fountain-water, or Coffee; to which we may add their lazy kind of Life (for Walking is never uſed by them for Digeſtion, or otherwiſe in the way of Diverſion), frequent Bathing becomes neceſſary.

There are ſeveral Receptacles of Water under Ground, and one particularly under the Church of *Sancta Sophia*, as I was informed; but I did not think it worth my Curioſity to deſcend into it. Theſe were of great Uſe, to the poor *Greeks* in the laſt fatal Siege; but the *Turks* are ſo ſecure, that they do not think that they deſerve either Coſt or Pains to keep th Waters ſweet, or the Ciſterns in repair.

The Aquæducts, which anſwer to thoſe glorious Aquæducts near *Pyrg* and convey the Water to the great Ciſtern near Sultan *Selim*'s Moſch, a in that Part of *Conſtantinople* which lies between the Moſchs of *Mahomet* *Great* and *Sha-zade*.

The *Turks* began to beſiege *Conſtantinople* on the 5th of *April*, and too it the 29th of *May*, on *Whitſun-Tueſday* Morning, 1453. or as the *Tur* reckon, in the Year 857. of the *Hegira*, or Flight of *Mahomet*, the 22d D of the Firſt *Jomad*.

The Chapel where *Ejub Sultan* is interred, at whoſe Head and Feet obſerved great Wax-candles, is incloſed with Latten Wire-grates, the better Accommodation of ſuch religious *Turks* as to come to pay th

Reſpect to the Memory of this great *Muſſulman Saint*. In the Middle of the *Area* there is raiſed a Building ſuſtained by excellent *Marble Pillars*, aſcended by two ſeveral Pair of Stairs, where the *new Emperor* is *inaugurated*, and where he uſually goes in *Biram* Time.

3. *Montanea*, formerly called *Nicopolis*, according to *Bellonius*, or rather *Cios*, the Bay hence called *Sinus Cianus*, lies in the Bottom of a Bay about 80 *Miles* from *Conſtantinople*, and is the *Scale* or Land-place for *Pruſa*, from which it may be about 12 *Miles*; in the middle Way to which is the Village *Mouſſanpoula*.

An Account of Pruſa *in* Bithynia, *and the Obſervations in* Turky *continued; by Dr.* Tho. Smith. *n.* 155. *p.* 431.

Pruſa, now called, by the *Turks*, *Burſia*, the chief City of *Bythynia*, is ſeated at the Foot partly, and partly upon the Riſing of the Mount *Olympus*, which is one of the higheſt Hills of the *Leſſer Aſia*. Its Top is covered with *Snow* for 9 or 10 Months of the Year, ſeveral Streams of Water flowing down the Hills continually, accounted very *unwholſome* from the *Snow* mixed with it. In the upper Part of the City, to the North-Weſt, lies the *Seraglio*, which is walled round; but the Emperors not reſiding here ſince their Acquiſts in *Thrace*, or ſcarce making Viſits to this Imperial City; and none of their Sons living here of late, according to the former Policy of the *Turkiſh* Emperors, who did not permit their *Sons* when grown up to be near them, but ſent them to ſome honourable Employment, accompanied with a *Baſſa* and *Cadi*, to inſtruct them in the Arts of War and Government, it lies now neglected and deſpoiled of all its Ornaments.

In this Part alſo are the *Sepulchres* of *Oſman*, the Founder of the Family which now reigns, and his Son *Urchan*, who took the City, near a *Moſque*, formerly a Chriſtian Church, dedicated to St. *John*, and where was formerly a *Convent* of *Religious*, built by *Conſtantinus Iconomachus*, where I ſaw the Figure of a *Croſs* ſtill remaining upon the Wall. Here hangs up a Drum of a vaſt Bigneſs, ſuch as they carry upon the Backs of *Camels*, and I ſuppoſe is one of thoſe which they uſed in taking of the Place.

In the lower Part, near the Bottom of the Hill, *Morad* II. the Father of *Mahomet the Great*, lies *buried*, near whereunto was formerly the *metropolitical Church* of the *holy Apoſtles*. The *Bezeſten*, or *Exchange*, ſeems to be much better and larger than the great one at *Conſtantinople*; as are ſeveral *Caravanſeras* built for the Uſe and Accommodation of Merchants and Travellers.

Without the City, toward the Eaſt, is the *Moſque* and *Sepulchre* of the Emperor *Bajazid* the *Firſt*, whom the *Turks* call *Jilderim*, or *Lightning*, and the *Greek* Writers Δαίλαψ. Not far from hence is the *Moſque* of *Mahomet* the *Firſt*, and his *Sepulchre*. Toward the Weſt, upon the Side of the Hill, is the *Moſque* of *Morad* the *Firſt*, whom they call *Gazi*, or the *Conqueror*, near which he lies *buried*. There are in the whole about 124 *Moſques*, ſeveral of which were formerly Chriſtian Churches, and between 50 and 60 *Chanes*. The *Caſtles* built by *Oſman*, when he beſieged the City, are ſlighted and unfortified, the one to the North, the other to the South-Weſt.

At *Checkenbe*, about a *Mile* and an *half* out of Town, are the *Hot-Baths*, much frequented both by *Chriſtians* and *Turks*. They are made very convenient to *bathe* in; and are covered over, that they may be uſed in all Weathers. Among others there is a large round Baſin, where they uſually divert themſelves by Swimming.

What Opinions the *Turks* have of our *bleſſed Saviour* and the *Chriſtian Religion*, I ſhall briefly ſhew, as they lie diſperſed in ſeveral Chapters of their *Alcoran*, according to which they frame their Diſcourſe whenſoever either their Zeal or Curioſity puts them upon this Topick. For *Mahomet*, upon his ſetting up to be the Author of a *new Religion*, finding ſuch a conſiderable Part of the World profeſſing the *Doctrine* of *Chriſt*, with all the *Myſteries* of *Faith* therein contained, was caſt upon a Neceſſity of ſaying ſomething both concerning *Him* and *It*. By which it will appear, how great the Power of Truth is above Impoſture and Subtility, and that as the *Devils* in the *Poſſeſſed* confeſſed, though againſt their Wills, *Chriſt* to be the *Son of God*, ſo this *Dæmoniack*, in the midſt of all his Forgeries and Lies, and ridiculous and childiſh Narratives, not being able to contradict the univerſal Belief of the *Chriſtians* of that and the preceding Ages, founded on the Hiſtory of the *Goſpel*, hath been forced to give Teſtimony to ſeveral Particulars of it.

They confeſs, that *Chriſt* was born of a pure ſpotleſs *Virgin*, the *Virgin Mary*, choſen by *God*, and ſanctified above all Women in the World; and that the Angel *Gabriel* was diſpatched out of Heaven to acquaint her with the News of it. That ſuch a kind of miraculous and ſupernatural *Birth* never happened to any beſides, and that *Chriſt* was conceived by the *Holy Ghoſt*, and that he wrought mighty Miracles, for inſtance, That he cleanſed *Lepers*, gave *Sight* to the *Blind*, reſtored *ſick* Perſons to their *Health*, and *raiſed the Dead*. That he is a great *Prophet*, ſent by God to convert Men from the Vanity and Error of their falſe Worſhip to the Knowledge of the *true God*, to preach Righteouſneſs, and to correct and reſtore the Imperfection and Miſcarriages of Human Nature. That he was of a moſt *holy* and *exemplary Life*. That he was the *true Word of God*, the *Apoſtle*, or *Ambaſſador of God*. That his *Goſpel* was *revealed* to him from Heaven, and that he is in Heaven, ſtanding nigh to the *Throne* of *God*. They blaſpheme indeed, with a Brutiſhneſs and Stupidity only befitting *Turks*, the Myſteries of the *Holy Trinity*, and of the *Divinity* of our *bleſſed Saviour*, and deny that he was *put* to *Death*, and ſay that another in his Shape was *crucified* by the *Jews*, and that he himſelf was aſſumed into Heaven in his Body without dying at all; and conſequently they will not own, that he ſatisfied divine Juſtice for the Sins of the World: So great an Affinity is there between the *Hereſy* of *Socinus* and profeſſed *Mahometaniſm*.

I could never yet ſee any *Turkiſh Tranſlation* of the *Alcoran*; they cry up the *Elegance* of the *Style*, which being *Enthuſiaſtick* and high-flown, by Reaſon alſo of the Tinkling of the Periods, is very delightful to their Ears, who ſeem to be affected with *Rhyme* mightily. Though, I ſuppoſe, it is upon a more politick Account that they are ſo averſe, as to the *tran-*

ſlating it into their vulgar Language, not out of Reſpect to the Sacredneſs of the Original only, whoſe full commanding Expreſſions they think cannot be *tranſlated* without a great Diminution to the Senſe, but to keep it in greater Veneration among the People, who might be apt to ſlight and diſeſteem it, ſhould it become thus common amongſt them. It is enough that the *Prieſts* and *learned* Men explain the difficult Paſſages of it to the People, and write Commentaries for the Uſe of the more curious and inquiſitive. The *Perſians*, on the contrary, think it no Diſparagement to the *Arabic*, or Profanation of the Senſe, to *tranſlate* this curſed Book into their own Language; and Copies are frequent among them.

The *Grand Signior's Women* are uſually the choiceſt Beauties of the *Chriſtian* Spoils, preſented by the *Baſſa's* or *Tartars*. The preſent *Sultana*, the Mother of the young Prince *Muſtapha*, is a *Candiot*; the *Valide*, or Emperor's Mother, a *Ruſſian*, the Daughter of a poor Prieſt, who with her Relations were ſeized upon by the *Tartars*, in an Incurſion which they made into the *Muſcovites* Country. She being received into the *Seraglio*, by her beautiful Complexion, and cunning Behaviour, gained the Heart and Affection of Sultan *Ibrahim* (a Man wholly addicted to ſoft Pleaſures, and who ſeldom cared to be long abſent from the Womens Apartment, but choſe to ſpend his Time among them). Having the good Fortune to be the Mother of Prince *Mahomet*, the eldeſt Son of his Father, who now *reigns*, ſhe had all the Honours that could poſſibly be done her, and was the beloved *Hazaki*, or Chief Concubine. During this Height of Splendor and Glory, the Court removing from *Conſtantinople* to *Adrianople*, diſtant about 120 *Miles*, as ſhe was paſſing in great State, attended with her Guards through the Streets of the City, in a Coach much like our Carriage-Waggons, but that they are latticed to let in the Air (for no one muſt preſume to ſtare, or ſcarce look upon the Women, much leſs muſt they themſelves ſuffer their Faces to be ſeen in this jealous Country), ſhe out of Curioſity looking through the Holes, ſaw a poor Chriſtian Slave in a Shop where Sugar and ſuch-like Wares were ſold. Upon her Return ſhe ſent one of her *Eunuchs* to inquire for the Perſon, and to aſk him ſeveral Queſtions about his Country, Relations, Friends, and the Time when, and how long he had been a Slave: His Anſwers were ſo particular and ſatisfactory, that ſhe was ſoon convinced of the Truth and Certainty of her Apprehenſions, when ſhe firſt caſt her Eyes upon him, that he was her Brother, and accordingly it proved ſo. Whereupon acquainting the Emperor with it, ſhe immediately redeemed him from his Patron, and having made the poor Wretch turn *Turk*, got him conſiderably preferred.

The *Baſſa's* for the moſt part are the Sons of *Chriſtians*, taken into the *Seraglio*, near the *Emperor's* Perſon, and ſo are preferred to conſiderable Governments, or elſe they raiſe themſelves by their Conduct and Valour. *Mahomet Baſſa*, in the Time of *Achmet*, whoſe eldeſt Daughter he married, was the firſt natural *Turk* that was made *Chief Vizir*, having before been *Captain Baſſa*. The *Chief Vizir*, *Mahomet Kupriuli* (who ſettled the Empire in the Minority of this Emperor, when it was ready to be ſhaken in

Pieces, and diſſolved by ſeveral powerful Factions in the State, and by the Mutinies and Diſcontents of the *Janizaries* and *Spahi's*, who drove different Ways) was an *Albaneſe* by Birth, the Son of a *Greek* Prieſt, whom, out of the Height of his Zeal for *Mahomet*, he made turn *Turk* in his old Age, and converted the *Chriſtian Church* in the Village where he was born, into a *Moſque*. This Man alſo forbad the *Derviſes* to dance in a Ring, and turn round, which before was their ſolemn Practice at Set Times before the People, which they would do ſo long, till they were giddy by this ſwift circular Motion, and fell down in a Swoon, and then oftentimes, upon their Recovery from ſuch Trances, they pretended to *Revelation*. The Church-men are not very kind to his Memory, looking upon him as a Man of little or no Religion; and they give out, that if he had lived, he would have forbid their *calling to Prayers* from the Spires of their *Moſques*, and *hanging out Lamps*; both which they look upon as ſolemn and eſſential to the Exerciſe of Religion, but he, as the Effect of Bigotry and Superſtition.

They have a mighty Honour and Eſteem for *Phyſicians*, for though they are of Opinion, that they cannot with all their Art prolong Life, the Period and Term of it being fatal and alſolutely determined by God, yet they often conſult them upon any violent Sickneſs or Pain, in order to make the Time allotted them in the World more pleaſant and eaſy. It is extraordinary rare, that a *natural Turk* makes Phyſick his Profeſſion and Study. They who practiſed it among them, when I was in *Turky*, were for the moſt part *Greeks* and *Jews*, who know nothing of chymical Medicines, but follow the uſual Methods which they learned in *Italy* and *Spain*, the former having ſtudied in *Padua*, and the latter in *Salamanca*, where they paſſed for good *Catholicks*; and I remember I met with a certain *Jew Phyſician*, who had been a *Capuchin* in *Portugal*. During the tedious Siege of *Candia*, the *Vizir*, what with Melancholy, and what with the ill Air of the Camp, finding himſelf much indiſpoſed, ſent for a *Chriſtian* Phyſician, Signior *Maſſalim*, a Subject of the Republick of *Venice*, but married to a *Greek* Woman, to come ſpeedily to him, and made him a Preſent of about 1000 *Dollars*, in order to fit himſelf for the Voyage, and bear the Expence of it. By this worthy Gentleman's Care, he recovered his Health, and would not permit him to depart till after the Surrendry of that City, which might be about 7 Months after his Arrival there, treating him in the mean while with all imaginable Reſpect. During our ſhort Stay at *Burſia*, one of our *Janizaries* accidentally diſcourſing with a *Turk* about us, whom they knew to be *Franks*, told him, that there was a Phyſician in the Company who had been lately at the Grand Signior's Court at *Salonoki*, with the *Engliſh* Ambaſſador, and was now upon his Return from *Conſtantinople* to *Smyrna*, where he lived. This preſently took Vent, and the *Turks* thought that they had got a Man among them that could cure all Diſeaſes infallibly; for ſeveral came immediately to find us out on behalf of themſelves or their ſick Friends; and one of the moſt conſiderable Men upon the Place deſired the *Doctor* to go to his Houſe, to viſit one of his Women ſick in Bed; who being permitted to feel her naked Pulſe (for uſually they throw a Piece of fine Silk or Curle over their Womens Wriſts at ſuch Times), ſoon diſcovered by that, and other Symptoms and Indications of her Diſtemper, that *opening a Vein* would preſently give her Eaſe, and recover her; which he did accordingly, for which he received an embroidered Handkerchief inſtead of a Fee, and gained the Reputation of having done a mighty Cure.

They have little of ingenious or ſolid *Learning* among them; their chief Study, next to the *Alcoran*, being *Metaphyſical* Niceties about the Attributes of God, or elſe the Maintenance of odd ſpeculative Notions and Tenets, derived down to them from ſome of their famed Maſters and holy Men, whom they pretend to follow. Their Knowledge of the *Motion* of the *Heavens*, for which the *Arabians* and other *Eaſtern* Nations have been ſo deſervedly famous, as their *Aſtronomical Tables* of the *Longitude* and *Latitude* of the *fixed Stars*, and of the *Appulſe* of the *Moon* to them, fully evince, is now very mean, and is chiefly ſtudied for the Uſe of *Judiciary Aſtrology*. The great Inſtrument they make uſe of is an *Aſtrolabe*, with which they make very imperfect *Obſervations*, having no ſuch thing as a *Quadrant* or *Sextant*, much leſs a *Teleſcope*, or any mechanical Engine, to direct and aſſiſt them in their Calculation.

Their Skill in *Geography* is as inconſiderable: I remember I heard the *Captain Baſſa*, whom they ſtile *Admiral* of the *Black* and *White Seas*, meaning the *Euxine* and *Mediterranean*, aſk this ſilly Queſtion, Whether *England* was out of the *Straits?* And, at another Time, the *Caimacan* or *Governor* of *Conſtantinople*, hearing that *England* was an Iſland, deſired to know how many Miles it was about, in order, we ſuppoſed, to make an Eſtimate of our King's Greatneſs and Strength by the Extent and Compaſs of it.

One of the great *Aſtrologers* of *Conſtantinople* having heard that I had a Pair of *Globes* in my Chamber, made me a Viſit on purpoſe to ſee their Contrivance, being introduced by a worthy Gentleman of our own Nation. After the firſt Ceremonies were over, I took my *Terreſtrial Globe*, and rectified it to the Poſition of the Place, and pointed to the ſeveral *Circles* both without and upon it, and told him in ſhort the ſeveral Uſes of them; then ſhewed him how *Conſtantinople* beared from *Candia* (at that Time beſieged), *Cair*, *Aleppo*, *Mecca*, and other chief Places of the Empire, with the other Parts of the World; at which he was mightily ſurpriſed to ſee the whole Earth and Sea repreſented in that Figure, and in ſo narrow a Compaſs, and pleaſed himſelf with turning the Globe round ſeveral times together. Afterwards I ſet before him the *Celeſtial Globe*, and rectified that, and ſhewed him how all the noted *Conſtellations* were exactly deſcribed, and how they moved regularly upon their *Poles*, as in the *Heavens*; ſome riſing and others ſetting; ſome always above the *Horizon*, and others always under, in an *oblique Sphere*, and particularly what Stars would riſe that Night with us at ſuch an Hour. The Man ſeemed to be raviſhed with the Curioſity of it, turning this Globe alſo ſeveral times together with his Finger, and taking a mighty Pleaſure in viewing the Motion of it; and yet this ſilly Animal paſt for a *Conjurer* among the *Turks*, and was looked upon as one that could foretel the Events of Battles, and the Fates of Empires, and the End of the World.

They have no Genius for *Sea-Voyages*, and conſequently are very raw and unexperienced in the Art of *Navigation*, ſcarce venturing to ſail out of Sight of Land. I ſpeak of the *natural Turks*, who trade either into the *Black Sea*, or ſome Part of the *Morea*, or between *Conſtantinople* and *Alexandria*, and not of the Pirates of *Barbary*, who are for the moſt part *Renagadoes*, and learn their Skill in *Chriſtendom*, which they exerciſe ſo much to the Terror and Damage of it. A *Turkiſh Compaſs* conſiſts but of 8 *Points*, the 4 *Cardinal* and 4 *Collateral*; they being at a mighty Loſs how to ſail by a Side-Wind, when, by hauling their Sails *ſharp*, they might lie their *Courſe*, and much more when they are in the *Wind's Eye*, not knowing how to make *Tacks* and *Boords*, but chooſe rather to make haſte into ſome neighbouring *Port* till the Wind blows *fair*.

They trouble not themſelves with reading the *Hiſtory* of other *Nations*, or of antient Times, much leſs with the Study of *Chronology*, without which *Hiſtory* is very lame and imperfect; which is the Cauſe of thoſe ridiculous and childiſh Miſtakes which paſs current and uncontradicted among them. For inſtance, they make *Job* one of *Solomon*'s *Judges*, and (*Iſcander*) *Alexander* the Great, *Captain General* of his Army. They number *Philip* of *Macedon* among the *Anceſtors* of our *bleſſed Saviour*, and believe that *Sampſon*, *Jonas*, and St. *George* were his Contemporaries. In this they are more excuſable than their falſe Prophet *Mahomet*, who, in his *Alcoran*, has perverted ſeveral *hiſtorical* Notices in the Writings of the *Old Teſtament*, and is guilty of vile and abſurd *Pſeudo-Chroniſms*. To remedy this Defect, of which he was very conſcious, and the better to underſtand the State of *Chriſtendom*, and the particular Kingdoms and Republicks of it, the late *great* and *wiſe Vizir Achmet* made his Interpreter *Panagiotti*, a learned *Greek*, at leiſure Hours, even at the Siege of *Candia*, as well as other Times, read ſeveral antient *Hiſtories* to him, aud render them *extempore* into the *Turkiſh* Language, and particularly *Bleau*'s *Atlas*, with which he was mightily pleaſed, and made great uſe of, and truly gained the Reputation of a ſolid and judicious *Stateſman*, as well as *Soldier*, among the *Chriſtian* Miniſters, who in the ordinary Courſe of their Negotiations applied themſelves to him.

Though their *Year* be according to the *Courſe* of the *Moon*, and ſo the *Turkiſh Months* run round the *Civil Year* in a Circle of 33 *Years*, and a few odd *Days*, yet they celebrate the *Neuruz*, which ſignifies, in the *Perſian* Tongue, the *New Year*, the 21ſt of *March* (on which Day the *Vernal Equinox* was fixed by the *Greeks*, and other *Oriental Chriſtians*, in the Time of the Emperor *Conſtantine*, who made no Proviſion for ϖροήγησις ἰσημερινὴ or *Proceſſion*, which in Proceſs of Time the Inequality between the *Civil* and *Aſtronomical Year* muſt neceſſarily produce) at which Time the *Cadies* and other *annual Magiſtrates* and Farmers of the *Cuſtoms* take place, and reckon to that *Day Twelve-Month* again.

In their *civil* Deportment and Behaviour one towards another, the *Left Hand* is the more worthy and honourable Place, except among their *Eccleſiaſticks*; and the Reaſon they alledge is, becauſe they *write* from the *Right Hand*, and the *Sword* is worn on the *Left Side*, and ſo is more at his Diſpoſal who walks on that Hand. The *Chief Vizir* accordingly in the *Divan* ſits on the *Left Hand* of the *Mufti*, each maintaining their Right of Precedence according to this Way of Deciſion.

In their *Moſques* they ſit without any Diſtinction of Degrees.

Some of the more zealous *Turks* cauſe to be engraven on their *Scimiters* and *Bucklers* a *Sentence* out of the 61ſt *Surat*, which is concerning *Fighting*, or *Battle Array*, and contains Encouragement to *fight in the Way and Path of God*, as the Impoſtor words it; for which he aſſures them, beſides Aſſiſtance from Heaven, to help them to get the Victory over their Enemies, and that *God* will *pardon their Sins*, and bring them to *Paradiſe*. Thus ſpirited with Zeal, a *Turk* lays about him with Fury when he is a Fighting, and ſeems ambitious of *dying*, to gain the Delights of *Paradiſe*, at leaſt indifferent whether he *dies* or *lives*.

The *Turks* are, as to their *Temper*, ſerious, or rather inclining to Moroſity, ſeldom Laughing, which is accounted an Argument of great Vanity and Lightneſs. They perform the Exerciſes which they uſe in the Way of Diverſion, as Shooting and Hunting, with a great deal of Gravity, as if they deſigned them more for Health than for Pleaſure, and this too but ſeldom. The better and richer Sort, who have nothing to do, ſit all Day at home, lolling upon a *Sofa*, or *raiſed Place* in their Rooms, and taking *Tobacco*, which their Slaves fill and light for them; and if they retire in the Summer or Autumn for a Week or Fortnight, to ſome convenient Fountain in a Wood, with their Women, it is chiefly to enjoy the Refreſhments of the cool Air. In Times of *Triumph*, indeed, for ſome great Succeſs obtained againſt the *Chriſtians*, when the Shops are open for three Nights together, and hung with *Lights* as well as the *Spires* of the *Moſques* in curious *Figures*, they are guilty of extravagant Mirth, running up and down the Streets in Companies, and ſometimes Singing and Dancing after their rude way; but this Fit being over, they ſoon return to their former *Melancholy*. In the *Coffee-Houſes*, where they uſe to reſort to tipple, there is uſually one hired by the Owners, to read either an idle *Book of Tales*, which they admire as Wit, or filthy obſcene Stories; with which they ſeem wonderfully affected and pleaſed, few of them being able to read. Theſe are the *Schools* which they frequent for their Information; though in Times of War, when Things went ill with them, their Diſcourſes would be of ill Government; and the *Grand Signior* himſelf, and his Chief Miniſters, could not eſcape their Cenſures; which manifeſtly tending to Sedition, and to the heightening of their Diſcontents by their mutual Complaints, and by this free venting of their Grievances during the War at *Candia*, the wiſe *Vizir*, ſeeing the evil Conſequences that would follow, if ſuch Meetings and Diſcourſes were any longer tolerated, commanded that all the publick *Coffee-Houſes* ſhould be ſhut up in *Conſtantinople*, and ſeveral other great Cities of the Empire, where the Malecontents uſed to rendezvous themſelves, and find Fault upon every ill Succeſs and Miſcarriage, with the Adminiſtration of Affairs.

That *Cuſtom* of the *Turks* to *ſalute* the *Emperor*, or the *Vizir Baſſa's*, with loud Acclamations and Wiſhes of Health and long Life, when they appear firſt in their Houſes, or any publick Place, is derived from the *Greeks*, who took it from the *Romans*. This was done by them in a kind of ſinging Tone; whence *Luitprandus*, Biſhop of *Cremona*, tells us, That in a certain *Proceſſion* (ϖροέλευσις) at which he was preſent, they *ſang* to the *Emperor Nicephorus* ϖολλὰ ἔτη, that is, *Many Years* (which *Codinus*, who lived juſt about the taking of *Conſtantinople* by the *Turks*, expreſſes by τὸ ψάλλειν τὸ πολυχρόνιον, or by τὸ πολυχρονίζειν, and the *Wiſh*, or *Salute*, by πολυχρόνισμα) and at Dinner the *Greeks* then preſent *wiſhed* with a loud Voice to the *Emperor* and *Bardas*, *ut Deus Annos Multiplicet*, as he tranſlates the *Greek*.

The *Turkiſh Coin* in itſelf is pitiful and inconſiderable, which I aſcribe not only to their want of *Bullion*, but to their little Skill in Matters relating to the *Mint*. Hence it comes to paſs, that *Zecchines* and *Hungars* for *Gold*, and *Spaniſh Dollars* and *Zallots* for *Silver*, ſtamp'd in *Chriſtendom*, paſs current among them; moſt of the great Payments being made in them, they not caring, either through Ignorance or Sloth, to follow the Example of the *Indian* or *Perſian Emperors*, who uſually melt down the *Chriſtian Money*, imported by the Merchants into their ſeveral Countries, and give it a new *Stamp*. The moſt uſual Pieces are the *Sheriphi* of *Gold*, ſomewhat leſs in Value than a *Venetian Zecchine*; and *Aſpers*, ten of which are equal to Sixpence *Engliſh*; and ſome few *Three-Aſper* Pieces. A *Mangur* is an ugly old *Copper Piece*, eight of which make but one *Aſper*; and is not I think a *Turkiſh Coin*, but rather *Greek*. They have no *Arms* upon their *Coins*, only *Letters* emboſſed on both Sides, containing the *Emperor's Name*, or ſome ſhort Sentence out of the *Alcoran*.

The *Turks* look upon *Earthquakes* as ominous, as the Vulgar do upon *Eclipſes*, not underſtanding the Philoſophy of them. During my Stay in *Conſtantinople*, which was above two *Years*, there happened but one, which was *Oct*. 26. 1669. about 6 o'Clock in the *Morning*, a ſtark Calm preceding. It laſted very near a *Minute*, and we at *Pera* and *Galata* were as ſenſible of it as thoſe who were on the other Side of the Water; but praiſed be God nothing fell, and we were ſoon rid of the Fears in which this frightful Accident had caſt us.

The *Turks* made direful Reflections on it, as if ſome Calamity would inevitably fall upon the *Empire*, quickly forgetting the great Triumphs and Rejoicings which they expreſſed but a few Days before for the Surrendry of *Candia*. In the *Year* 1668. in *Auguſt*, the *Earth ſhook*, more or leſs, 47 *Days* together in the *leſſer Aſia*, at *Angure* (*Ancyra*) and for 15 at *Batbaſar*, as we heard from a *Scotch Merchant* who lived there; and particularly, that at this latter Place, on the 2d of *Auguſt*, between 3 and 4 of the Clock in the Afternoon, it laſted for a *quarter* of an *Hour*: Several Houſes were *overthrown*, and ſome Hundreds of Chimneys *fell* (it being a very populous Town) and yet there were but 7 *killed.* The *Trembling* being ſo violent, both *Turks* and *Chriſtians* forſook their Houſes, and betook themſelves to the *Fields*, *Vineyards*, and *Gardens*, where they made their Abode for ſeveral Days.

Their *Puniſhments* are very ſevere; this being judged the moſt effectual Way to prevent all *publick Diſorders* and *Miſchiefs.* They uſe no great Formality in their *Proceſſes:* If the *Criminal* be taken in the Fact, and the *Witneſſes* ready and preſent to atteſt it, and ſometimes if there be but *probable* Circumſtances, without full Convictions, they *condemn* him: And ſoon after Sentence, ſometimes in an *Hour* or *leſs*, hurry him away to *Execution.* For an ordinary Crime, *Hanging* is the uſual Death; but for *Robbery* and *Murder*, committed upon the *Highway* by ſuch as rob in Parties and alarm whole Provinces, or for *Sacrilege*, or for any *heinous Crime* againſt the *Government*, either *Gaunching*, or *Excoriation*, or *Cutting* off the *Legs* and *Arms*, and leaving the *Trunk* of the *Body* in the Highway, or *Empaling*, that is, thruſting an Iron Stake through the Body, out under the Neck, or at the Mouth; in which *extreme Torment* the miſerable Wretch may live 2 or 3 *Days*, if the *Guts* or *Heart* happen not to be wounded by the pointed Spike in its Paſſage. This *Puniſhment* ſeems to have been in Uſe among the *Romans*; *Seneca*, *Epiſtle* 14. *Cogita hoc loco Carcerem, & Cruces, & Eculeos, & Uncum, &* Adactum *per* Medium Hominem, *qui per* Os *emergat, ſtipitem:* And ſo in his Book, *De Conſolatione ad* Marciam, *cap.* 20. *Alii Capite converſos in terram ſuſpendere: Alii per Obſcæna Stipitem egerunt: Alii Brachia Patibulo explicuerunt.* *Murder* is ſeldom *pardoned*, and eſpecially if the Relations of the *murdered* Perſon demand Juſtice.

The *Circumciſion*, though it be a *ſacred Right*, is performed in their private Houſes, and never in the *Moſques.*

The *Women* colour their *Eye-brows* and *Lids* with an ugly *black* Powder, I ſuppoſe to ſet off their *Beauty* by ſuch a Shadow; and their *Nails* with the Powder of *Kanna*, which gives them a Tincture of faint *Red*, like Brick (as they do the *Tails* and *Hoofs* of *Horſes)* which they look upon as a great *Ornament.* Their great *Diverſion* is *Bathing*; ſometimes thrice, if not four Times a Week. They do not permit them to go to *Church* in Time of *Prayer*, for fear they ſhould ſpoil their Devotion; the *Turks* being of ſo brutiſh a Temper, that their Luſt is raiſed upon the Sight of a fair Object. They are called oftentimes by the *Names* of *Flowers* and *Fruits*, and ſometimes *fantaſtick Names* are given them, ſuch as *Sucar Birpara*, or Bit of Sugar; *Dil Ferib*, or Raviſher of Hearts, and the like.

Their Skill in *Agriculture* is very mean. In their *Gardens* they have ſeveral little *Trenches*, to convey Water where it may be moſt neceſſary for their *Plants* and *Flowers.* They know little or nothing of *Manuring* their Grounds: Sometimes they *burn* their Fields and Vineyards after Harveſt and Vintage, partly to *deſtroy* the *Vermin*, and partly to *enrich* the *Soil.* They *tread out* their *Corn* with *Oxen*, drawing a ſquare Plank-Board, about a *Foot* and an *half* or *two Feet* over, ſtudded with Flint; and *winnow* it upon their

Threſhing-Floors in the open Air, the Wind blowing away the Chaff. They *feed* their *Horſes* with *Barley* and *Chopp'd Straw*; for I do not remember ever to have ſeen any *Oats* among them; and they make but little *Hay*.

For *Draught* of great Weight in their Carts, they make uſe of *Buffallos*.

Camels will endure Travel 4 *Days* together without *Water*, and will eat Tops of *Thiſtles*, *Shrubs*, or any kind of Boughs. They are very Sure-footed, and kneel when they are a-loading. They live to a conſiderable Number of *Years*, ſome even to 60.

Their chief Furniture of their Houſes are *Carpets* or *Mats* of *Grand Cairo*, neatly wrought with Straw, ſpread upon the Ground; they having no Occaſion for *Chairs*, *Couches*, *Stools*, or *Tables*, their Poſtures within Doors being different from ours. They have no *Hangings*, but their Walls are whited, and ſet off with *Painting*, only adorned with a kind of *Porcelane*; no *Beds* cloſed with *Curtains*.

They *ſeal* not with *Wax*, but *Ink*, at the Bottom of the Paper; the *Emperor*'s Name being uſually written with Flouriſhes, and in perplexed Characters: Nor have they any *Coats of Arms* upon their *Seals*, there being no ſuch thing as *Gentility* among them.

Some of them, notwithſtanding their Zeal for *Mahomet*, and their *Religion* by him eſtabliſhed, retain not only a favourable and honourable Opinion of our *Bleſſed Saviour*, but even place ſome kind of Confidence in the Uſage of his *Name*, or in the Words of the *Goſpel*, though it may ſeem to be wholly in the way of Superſtition. Thus in their *Amulets*, which they call *Chaimaili*, being little Bits of Paper 2 or 3 Fingers Breadth, rolled up in Pieces of Silk, containing ſeveral ſhort Prayers and Sentences out of the *Alcoran*, with ſeveral Circles with other Figures, they uſually inſcribe the holy and venerable Name of *JESUS*, or the Figure of the *Croſs*, or the firſt Words of St. *John*'s *Goſpel*, and the like. They hang them about their Necks, or place them under their Arm-pits, or in their Boſoms, near their Hearts (being the ſame with what the *Greeks* call εγκολπια) and eſpecially when they go to War, as a Preſervative againſt the Dangers of it; and indeed againſt any Miſfortune whatſoever. Some have them ſewed within their Caps: And I heard of a *Turk* that was ſo ſuperſtitious herein, that he always plucked it off, and was uncovered when he had Occaſion to make Water. Some are ſuch Bigots in their *Religion*, and ſo furious againſt *Chriſtians*, that not only they treat them with all imaginable Scorn and Contempt, but take it ill to be *ſalamed* or *ſaluted* by them; as if it were the Effect of Saucineſs, or unbecoming Familiarity. Their Malice againſt the *Chriſtians* makes them envy the rich Furs they line their Veſts with, and it is a Trouble to theſe hypocritical Zealots, to ſees the *Franks* ride upon their fine *Arabian* Horſes.

The Reſpect which they ſhew the *Alcoran* is wonderful; they dare not open the Leaves of it with unwaſhen Hands, according to the Advice or Command written, in *Arabick*, upon the Cover, *Let no one Touch this Book* *but he that is clean.* They kiſs it, and bend their Heads, and touch their Eyes with it, both when they open it and ſhut it.

The *Janizaries*, when they attend upon *Chriſtian Ambaſſadors* to their *Audience*, ſeem to appear in their Bravery, and in a Habit far from that of a *Soldier*, being without either *Fire Arms* or *Swords* (which latter are not worn but in Time of Service, or when they are upon a March, or embodied), wearing a Cap made of *Camel's Hair*, with a broad Flap dangling behind, a gilt embroidered Wreath running round it, and an oblong Piece of Braſs riſing up from the Middle of their Forehead near a Foot, with a great Club in their Hand, like inferior Officers of the *Civil Government*. But when they are in the *Camp* they throw off their upper Veſt, and *Turbants*, which they wear at all other uſual Times, as troubleſome, and put on a *Feſs*, or red Cap, which fits cloſe to their Head, and tuck up their *Duliman*, or long Coat, to their Girdle, that they may be the more quick or expedite in their Charge.

They affect Finery and Neatneſs in their Cloaths and Saſhes; not ſo much as a Spot to be ſeen upon them, and in rainy or ſuſpicious Weather, are very careful how they go abroad without their *Yamurlicks*, which is a kind of Coat they throw over their Heads at ſuch times.

Their Pans and Diſhes are for the moſt part of *Copper*, but ſo handſomely *tinn'd* over, that they look like *Silver*.

There are Thouſands of *Gypſies* or *Zinganies* in *Turkey*, who live the ſame idle naſty kind of Life as they do in *Chriſtendom*, and pretend to the ſame Art of *telling Fortunes*; and are looked upon as the Off-ſcouring of Mankind. It is accounted the extremeſt Point of human Miſery to be a *Slave* to any of this Sort of Cattle.

The *Haggai*, or *Pilgrims*, that have been at *Mecca* and *Medina*, forbear to drink Wine moſt religiouſly, out of a Perſuaſion that one Drop would efface all the Merits of that troubleſome and expenſive Journey: And ſome have been poſſeſſed with ſuch a mad Zeal, that they have *blinded* themſelves, after their having been bleſſed with the Sight of *Mahomet's Sepulchre*.

After *Jatzib*, that is an *Hour* and *half* in the Night, throughout the whole Year, there is as great a Silence in the *Streets* as at Midnight: The Emperor *Achmet*, in the Year 1611, having made an Order, that no one ſhould preſume to be out of his Houſe after that Time; which is to this Day moſt punctually obſerved. The *Boſtangi Baſhi*, who has the Command of all the *Agiamoglans* in the *Seraglio*, the *Topgi Baſhi*, or ſuch great Officers, attended with a great Train of armed Men, walking the Rounds, and drubbing ſuch as they find abroad at unſeaſonable Hours, of what Nation or Quality ſoever, except *Phyſicians*, *Surgeons*, and *Apothecaries*, whom they allow to viſit the Sick.

The *Turkmans* (for ſo they are peculiarly called, as if they were the true Deſcendants of the *old Turks* or *Scythians*) have no fixed Reſidence anywhere, but travel with their Families and Cattle from Place to Place, carrying their Wives and Children upon Camels. They pitch their Tents uſually near Rivers and Fountains for the Convenience of Water, and according as their Neceſſities require, make a longer, or a ſhorter Stay. Their whole Eſtate conſiſts in their numerous Flocks and Herds, which they ſell, upon Occaſion, to ſupply themſelves with what they want, at the Towns they paſs by, Their only Concern is how to enjoy the Benefits and Bleſſings of Nature, without the Troubles, and Turmoils, and Diſquiets of Life, being contented and happy in one another's Company; void of all Ambition and Envy; courteous and humane to Strangers, that may want their Help and Aſſiſtance, kindly entertaining them with ſuch Proviſion as their Folds afford. The Country lies open without any Incloſures, and the Propriety not being veſted in any one, they travel through the Plains unmoleſted, and find excellent Paſturage every where. The *Turks* till no more Ground than will ſerve their Neceſſities; being ſupplied with *Corn* from *Ægypt*, and from *Moldavia* and *Walachia*, by the Way of the *Black Sea*; letting vaſt Tracts of Ground lie waſte and uncultivated: So that their Sloth herein ſometimes is juſtly puniſhed with Dearths.

They have nothing to *ſhew* for their *Houſes* and *Poſſeſſions*, but an *Hogiet*, or Piece of Paper ſubſcribed by the *Cadi*, if they have acquired them by their Money, or that they were their Father's before them.

The *Derviſes* generally are melancholy, and place the greateſt Part of their Religion in *Abſtinence*, and other Severities. Some cut their Fleſh, others vow not to ſpeak for 6 or 7 Years, or all their Lives long, though never ſo much provoked or diſtreſſed. Their Garments are made of a coarſe Sort of Wool or Goats-Hair. They are tied up by the Vow of their Order ever from marrying. Several of this *Sect*, in the Height of their religious Phrenzy, have attempted upon the Lives of the *Emperors* themſelves (at whoſe Government they have taken Diſguſt) as *Mahomet* the Second, and *Achmet*, as if ſuch deſperate Attempts were fatal to *Bigots* in all Religions.

They pay a mighty Veneration to any *Relick* of *Mahomet*; his *Banner* is ſtill preſerved in the Treaſury of the *Seraglio*, and looked upon as the great Security of the Empire. They believe that it was ſent from Heaven, and conveyed into the Hands of *Mahomet*, by the *Angel Gabriel*, as a Pledge and Sign of Succeſs and Victory in his Battles againſt the *Chriſtians*, and all other Enemies of the *Muſſulman Faith*. It was ſent to *Candia* to encourage the Soldiers to endure the Fatigue of that long and tedious Siege; and when it was brought thence, after the Surrendry of the City, to be depoſited in its uſual Place, the *Vizir* gave ſeveral *Chriſtian Slaves*, that rowed in the Galley that was fraught with this holy Ware, their Liberty. They pretend to have ſome Rags of *Mahomet*'s *Veſt*, to which they aſcribe great Virtue: In Confidence of which, the Emperor *Achmet*, in the Time of a great Fire, which raged at *Conſtantinople*, when all other Means failed, dipp'd Part of them in Water, to be ſprinkled upon the Fire, to rebate the Fury of it.

Next to the *Muſtil*, or *Cadaleskires*, are the *Molla's*, of which theſe *four* are the chiefeſt in Dignity: The *Molla* of *Gallata*, *Adrianople*, *Aleppo*, *Pruſa*; and after them are reckoned theſe 8, *Stambol Ephendi*, *Lariſſa*, *Miſr* or *Cairo*, *Sham* or *Damaſcus*, *Diarbekir* or *Meſopotamia*, *Cutaia*, *Sophia*, *Philippi*.

The *Prieſts* have no Habit peculiar to their Profeſſion, whereby they are diſtinguiſhed from others. If they are put from their *Moſques* for Miſcarriage, or Neglect of doing their Duty, or if they think fit to reſign and be *Prieſts* no longer, they may betake themſelves, without any Scandal, to *Secular* Employments; their former Character and Quality wholly ceaſing. While they remain *Prieſts*, they counterfeit a more than ordinary Gravity in their Diſcourſe and Walking; and affect to wear *Turbants* ſwelling out, and made up with more croſs Folds; which was all the Difference I could obſerve by their Head-Attire, which is various, though I could not find that this was conſtantly and ſtrictly obſerved.

In *Byram Time*, which is the great Feſtival of the Year, at which Time every one looks chearfully and merrily, among other Signs of mutual Reſpect, they beſprinkle one another with ſweet Water; they indulge to ſeveral Sports; and ſome are mightily pleaſed with Swinging in the open Air, the ordinary Sort of People eſpecially, paying only a few *Aſpers* for the Diverſion.

The *Government* is perfectly arbitrary and deſpotical, the Will and Pleaſure of the *Emperor* having the Force and Power of a Law, and oftentimes is above it. His bare *Command*, without any *Proceſs*, is enough to take off the Head of any Perſon (though never ſo eminent in Dignity; though uſually, for Formality, and to ſilence the Murmurings of the Soldiery and People, the Sentence is confirmed by the *Mufti*). Sometimes *Baſſas*, who have amaſſed great Treaſures in their Governments, are cut off in their own Houſes, in the midſt of their Retinue, the Meſſengers of Death producing the *Imperial Command*, uſually ſent in a black Purſe, and not a Sword drawn in their Defence. Others, if they are obnoxious to the leaſt Umbrage or Jealouſy, though diſmiſſed the *Seraglio* with all poſſible Demonſtrations of the *Grand Signior*'s Favour, and with rich Preſents, in order to take Poſſeſſion of Places of great Command in the Empire, before they have got two or three Days Journey from *Conſtantinople*, have been overtaken and ſtrangled. In the Army Commands are given according to Merit: Courage and Conduct are ſure to be rewarded, the Way lying open to the meaneſt Soldier to raiſe himſelf to be the Chief of his Order: But other Preferments depend upon mere Chance, and upon the Fancy of the Emperor, whether the Perſon be fit or no; and they are as ſoon loſt. The leaſt ill Succeſs or Miſcarriage proves oftentimes fatal, and a more lucky Man is put in his Place, and he ſucceeded by a third, if unfortunate in a Deſign, though managed with never ſo much Prudence and Valour. They admit of no *Hereditary Honours*, and have no Reſpect to *Deſcent* or Blood, except the *Ottoman Family*: He only is great and noble whom the *Emperor* favours, and while his Command laſts. According to a Tradition that paſſes current amongſt them, a *Baſſa*'s *Son*, by a *Sultana*, or a *Daughter*, or a *Siſter* of the *Emperor*, can riſe no higher than to be a *Sangiacbei*, or Governor of ſome little Province, much inferior to a *Baſſa*, and under his

Juriſdiction: Being born of *Slaves*, for the moſt part, they do not pride themſelves in their Birth, very few among them being ſcarce able to give any Account of their Grandfathers. They have no *Surnames*, but are diſtinguiſhed by their Poſſeſſions and Places of Abode: And enjoying by Law a Liberty of having what Women they pleaſe, they have little or no Regard to Alliance or Kindred.

Their *Empire* owes the Continuance of its Being to the Severity of the Government, which oftentimes takes Place without regard either to Juſtice or Equity; and to their frequent Wars, which prevent all Occaſions of Mutiny and Faction among the Soldiers, which happen frequently when unemployed. So that though Ambition may put a warlike *Sultan* upon enlarging his Territories by new Conqueſts, yet Reaſon of State forces a weak and effeminate Prince, ſuch as was *Ibrahim*, to make War for his own Security. Their *Politicks* are not owing to Books and Study, and the Examples of paſt Times, but to Experience, and the plain Suggeſtions of Nature and common Senſe. Their *Councils* formerly were open, and their Deſigns known and proclaimed before-hand, as if this had been a Bravery becoming their Greatneſs, and that they ſcorned to ſteal a Conqueſt. But they have learned ſince the Art of *Diſſimulation*, and can lye and ſwear for their Intereſt, and ſeem exceſſive in their Careſſes to the Miniſters of thoſe Countries which they intend to invade. But their Preparations for *Arming* are made with ſo much Noiſe, that an ordinary Jealouſy is ſoon awakened by it to oppoſe them, in caſe of an Attack. They ſeldom or never care to have War at both the Extremes of the Empire at the ſame Time; and therefore they are mighty ſolicitous to ſecure a Peace with *Chriſtendom*, when they intend a War upon the *Perſian*. And as much as is poſſible, they avoid quarreling with *two Chriſtian Princes* at once; being uſually at League either with *Poland* or *Muſcovy* when they war upon *Hungary*, and ſo on the contrary; dreading nothing more than an Union of the *Chriſtian* Princes bordering upon them, which would prove ſo fatal to their Empire, and quickly put a Period to their Greatneſs: For hereby they would be put upon a Neceſſity of making a *defenſive War*, to their great Loſs and Diſadvantage; and at laſt either be forced to beg a Peace of the *Chriſtians*, or run the Hazard of loſing all by a further Proſecution of the War. This they are very ſenſible of; and therefore as they take all Occaſions to promote Quarrels and Diſſenſions in *Hungary* and *Tranſylvania*, ſo they greatly rejoice when the Princes of *Chriſtendom* are at War one with another. This is their great Time of Advantage, and they know that it is their true Intereſt to purſue it, though they do not always, by reaſon of the ill Condition of their own Affairs, make uſe of it. During the *Civil Wars* of *Germany*, the *Baſſas* and other Commanders of the Army were very importunate with the *Grand Signior* to make a War on that Side, and to enlarge his Conqueſts as far as *Vienna*; no Conjuncture having been ever ſo favourable to conſummate ſuch a Deſign, in which *Solyman* ſo unhappily miſcarried: They promiſed him an eaſy Victory, aſſuring him, that the Animoſities of the Princes of the Empire were ſo heightened, that there was no room left for a Reconciliation; that he was but to go at the Head of an Army to take Poſſeſſion, and that *Auſtria* would ſurrender at the firſt News of his March towards it. The *Emperor* was not to be moved at that time by theſe Inſinuations and plauſible Diſcourſes; being continually urged, he as often denied. One Day, when they came to renew their Advice about the *German* War, he having given Order before, that ſeveral Dogs ſhould be kept for ſome Days without Meat, commanded that they ſhould be brought out, being almoſt ſtarved, and Meat thrown among them; whereupon they ſnarled, and bit one another: In the midſt of their Noiſe and Fighting, he cauſed a Bear to be let looſe in the ſame Area, the Dogs forgetting their Meat, and leaving off their Fighting, ran all upon the Bear, ready to prey upon him ſingly, and at laſt killed him. This Diverſion the *Emperor* gave his *Baſſas*; and left them to make the Application.

A certain *Prophecy*, of no ſmall Authority, runs in the Minds of all the People, and has gained great Credit and Belief among them, That their Empire ſhall be ruined by a Northern Nation, which has white and yellowiſh Hair. The Interpretation is as various as their Fancy. Some fix this Character on the *Muſcovites*: And the poor *Greeks* flatter themſelves with fooliſh Hopes, that they are to be their Deliverers, and to reſcue them from their Slavery; chiefly becauſe they are of their Communion, and owe their Converſion to the *Chriſtian Faith* to the Piety and Zeal of the *Grecian Biſhops* formerly. Others look upon the *Swedes* as the Perſons deſcribed in the *Prophecy*, whom they are moſt to fear. The Ground and Original of this Fancy, I ſuppoſe, is owing to the great Opinion which they have of the Valour and Courage of that warlike Nation. The great Victories of the *Swedes* in *Germany*, under *Guſtavus Adolphus*, were loudly proclaimed at *Conſtantinople*, as if there were no withſtanding the Shock and Fury of their Arms; and their continued Succeſſes confirmed the *Turks* in their firſt Belief; and their Fears and their Jealouſies were augmented afterwards, when *Charles Guſtave*, a Prince of as heroick a Courage, and as great Abilities in the Art and Management of War as the juſtly admired *Guſtavus*, entered *Poland* with his Army, and carried all before him; ſeized on *Warſaw*, and drove *Caſimire* out of his Kingdom, and had almoſt made an entire and abſolute Conqueſt, only a few Places holding out. This alarmed the *Grand Signior*, and the *Baſſas* of the *Porte*, as if the *Prophecy* were then about to be fulfilled; who did not care for the Company of ſuch troubleſome Neighbours, who might puſh on their Victories, and joining with the *Coſſacks*, advance their Arms further, and make their Country the Seat of War, which might draw after it fatal Conſequences. To prevent which, Couriers were diſpatched from *Conſtantinople* to *Ragotſki*, Prince of *Tranſylvania*, then in Concert with the *Swedes*, to command him to retire with his Army out of *Poland*, as he valued the Peace and Quiet of his own Country, and the Friendſhip of the *Grand Signior*, whoſe Tributary he was, and by whoſe Favour he had gained that Principality. And the *Crim-Tartars*, the ſworn Enemies of the *Poles*, who at that Time lay heavy upon them, were wrought upon by the ſame Motives and Reaſons of State, to clap up a Peace with them; that being freed from theſe Diſtractions,

ſtractions, they might unite their Forces the better together, and make Head againſt the *Swedes*.

The *Ambaſſadors* of *Chriſtian Princes*, when they are admitted by the *Grand Signior* to an *Audience* (their Preſents being then of courſe made, which are looked upon as Due, not to ſay as an Homage) are diſmiſſed in few Words, and referred by him to his *Wakil*, or Deputy, as he uſually ſtiles the *Chief Vizir*; and a ſmall Number of their Retinue only permitted the Honour of *kiſſing his Veſt*, and then rudely enough ſent away.

The *Grand Signiors* keep up the State of the *old Aſiatick Princes*: They do not expoſe themſelves often to the View of the People, unleſs when they ride in Triumph, or upon ſome ſuch ſolemn Occaſion: When they go to the *Moſqües*, or divert themſelves in the Fields, either in Riding or Hunting, they do not love to be ſtared upon, or approached: It is highly criminal to pry into their Sports, ſuch an inſolent Curioſity being often puniſhed with Death. The Story is famous of *Morad* III. who baiting a Bear in the *old Palace* with a Maſtiff, and eſpying three Fellows upon the Tower of *Bajazid*'s *Moſque*, who had planted themſelves to ſee the Sport, commanded their Heads to be ſtruck off immediately, and to be brought before him, which was done accordingly. Inſtances of ſuch *Capricios* are frequent in the *Turkiſh* Hiſtory; this following happened during my Stay at *Conſtantinople*.

Upon the Return of *Vizir Achmet* from *Candia*, after the Surrendry of that City, and a happy End put by him to that tedious and bloody War; he acquainting the preſent Emperor, then at *Adrianople*, with the Hiſtory of that famous Siege at large, made ſuch terrible Repreſentations of their and the *Venetians* Mining and Countermining one another, that the Emperor was reſolved, out of Curioſity, to ſee the Experiment made of a thing that ſeemed to him almoſt incredible. A Work was ſoon raiſed, and undermined, and above thirty Murderers, and Robbers upon the Highway, and ſuch like Villains, were put into it, as it were to defend it. The *Grand Signior* ſtood upon an Eminence, at ſome conſiderable Diſtance, expecting the Iſſue of it; upon a Signal given, the Mine was ſprung, and the Fort demoliſhed, and the poor Wretches torn piece-meal, to his great Satisfaction and Amazement.

The *Moon* is the auſpicious Planet of the *Turks*; according to the Courſe of which they celebrate their *Feſtivals*. They begin their *Months* from the firſt *Appearance* of it, at which time they chooſe, except a Delay brings a great Prejudice and Inconvenience with it, to begin their great Actions. The *Creſcent* is the *Enſign* of the *Empire*, which they paint in their Banners, and place upon the Spires of their *Moſques*. Next to the Day of the *Appearing Moon*, they pitch upon *Friday* to fight upon, to begin a Journey, and eſpecially their Pilgrimage toward *Mecca*, or to do any thing of great Conſequence, as very lucky and fortunate.

A Voyage of ſome English Merchants *at* Aleppo, *to* Tadmor; *by Mr.* Tim. Lanoy *and Mr.* Aaron Goodyear, *n.* 218. p. 129.

XL. 1. *July* 18, 1678, at 5 in the Morning we ſet out from *Aleppo*, being 16 *Engliſh*; but with Servants and Muleteers in all 40; and in 4 Hours and an half, travelling South by Eaſt, we arrived at a Village called *Cafferabite*, being at the Edge of the *Deſart*.

19. We roſe at One in the Morning, and directed our Courſe S. S. E. over the *Deſart*, for a Fountain called *Churraick*; but our Guide loſing his Way, there being no Path, it was near Noon before we found it. The Water is of a purgative Quality. In our Way we found two *Arabs* with two Aſſes, one whereof carried Water and a little Bread, the other they rode on by Turns; they had one Gun, wherewith they ſhot *Gazels*, the Bullets being a hard Stone broken round and caſed with Lead: They had on the Palms of their Hands, Elbows, Knees and Feet, ſome Gazel-ſkin tied, that they might be able to creep the better on the Ground to ſhoot; one of the Aſſes walking by as a Stalking Horſe, and the *Arab* imitating the Cry of the *Gazel* till he gets within Shot. Theſe *Arabs* are called *Silebee*. At the Well came to us ſome *Arabs*, that were making Aſhes of the ordinary Sort of Weeds called *Chuddraiſe*, *Ruggot*, and *Cuttaff*: Theſe they cut and dry, and putting them into a Pit, ſet Fire to them, and the Aſhes cake at the Bottom. The Aſhes they carry to *Eglib* and *Tripoli*, to make Soap of; but the beſt Sort of Aſhes are made of the Weed *Shinan*, which grows about *Tadmor*, *Soukney*, *Tibe*, and *Yarecca*: It grows like Broom in *England*, and in Shape reſembles *Coral*.

20. We roſe at 4 in the Morning, and travelling 2 Hours E. S. E. we arrived at *Andrene*, where we found the Ruins of 2 or 3 Churches, and of a great Town lying in a large Plain; where having taken ſome Fragments of *Greek* Inſcriptions, which afforded no certain Senſe, but yet were evidently *Chriſtian*, we marched again S. by E. and in about 4 Hours Time came to a pleaſant Aquæduct called *Sheck-alal*: This Aquæduct is cut through the main Rock, for a great way from the Mountains, and where it ends, the *Arabs* have made a Garden, which afforded us Melons, Cucumbers, Purſlain, &c. In a Grot hard by, there dwelt an *Arab* with his Family; he had a Dozen Buffalo's, which they uſed both for their Milk, and to plow the Ground, ſowing both Wheat and Barley: Hither the *Arabs* reſort, when they have committed any Robbery about *Aleppo*, or *Hama*, and here they repoſe and divide the Spoil.

21. We roſe at 4 in the Morning, and riding 2 Hours South, we came to a Ruin called *Briadeen*: Here we found the following Inſcription on a Stone, good Part in the Ground:

ΑΦΙΕΡωΘΗ ΑΑΙΑΥΝΔΙΟΥ ΤΟΥ ΑΜΦ ЄΤΟΥϹ
ΔΙΑ ΜΑΤЄΡΝΟΥ ΚΑ (III) ΑΠΠΙΟΥ ΚΑΙ ΜΑΙΚΟΥ ΚΝЄΤΜΝ
——Υ————Ν

From hence going S. E. in 4 Hours more, we came to a Well called *Coſtal* (which ſignifies a Spring in *Arabick*). Moſt Part of our Way through the Deſart we were troubled with Rat-Holes in great Numbers, like Coneyboroughs, which, by the Sinking in of the Earth, very much incommoded our Horſes and Mules. Theſe Rats have at their Tails a Buſh of Hair, and the *Arabs* eat them all, excepting one Part. From this Well we aroſe about 4 in the Afternoon, and began to aſcend ſmall Hills covered with Trees, which for the moſt part, were the ſmall *Piſtacho*'s which the *Arabs* pickle with Salt; but eaten green, are good to quench Thirſt. We travelled three Hours up the Hills, where we pitched that Night, having no other Water but what we carried with us; and at Night we had a ſmall Shower of Rain, a Thing unuſual in that Country at that Time of the Year.

22. We roſe by Two in the Morning, and travelling E. S.E. we came by Eleven to a Well called *G'bor*.

23. We roſe by One in the Morning, and travelling moſt Eaſt, we came to a large Plain, where we ſaw before us, on a high Mountain, a great Caſtle, called by the *Arabs Anture*. When we had travelled 2 or 3 Hours in this Plain, we eſpied an *Arab* driving towards us on a Camel with his Lance ſo faſt, that he came on a round Gallop, and we ſuppoſed him ſent as a Spy: Being come up to us, he told us he was of *Tadmor*, and that his Prince, the *Emir Melkam*, had that Day made Friendſhip with *Hamet Sbideed*, another Prince, and that together they had 400 Men; ſo that he kept us Company an Hour or Two, and inquired of our Muleteers if we were not *Turks* diſguiſed, with Intent to ſeize on *Melkam*; for we travelled with a *Bandiero*, the Impreſs being a *Hanjarr*, or *Turkiſh Dagger*, and a *Half-Moon*. We told him we were *Franks*, which he could hardly believe, wondering that we travelled thus in the Deſart, only out of Curioſity. Being come near to *Tadmor*, he went a little before us, and on a ſudden ran full Speed towards the Ruins, we not endeavouring to hinder him. Our Guide told us he was gone to acquaint the *Arabs* who we were, and that we ought to ſuſpect and prepare for the worſt; ſo we diſmounted 20 of our Servants, each having a long Gun and Piſtols at his Girdle, and placed them a-breaſt before us, we following at a little Diſtance behind, on Horſeback, with Carabines and Piſtols. In this Order we proceeded, and came to a moſt ſtately *Aquæduct* which runs under Ground in a direct Paſſage 5 Miles, and is covered with an Arch of Baſtard Marble all the Way, and a Path on both Sides the Chanel for 2 Perſons to walk a-breaſt; the Chanel itſelf being about an *Engliſh* Yard in Breadth, and three Quarters of a Yard in Depth. At 20 Yards Diſtance all the Way are *Ventiducts* for the Air to paſs, and the Holes are ſurrounded with ſmall Mounts of Earth to keep the Sand and Duſt from falling down. We marched cloſe by theſe Mounts, which might ſerve us for Defence, expecting every Moment that the *Arabs* would come to aſſail us, having the Diſadvantage of the Sun and the Wind in our Faces: Wherefore we travelled hard to gain an Eminence where we might poſt ourſelves advantageouſly, and ſtop and repoſe a little to conſider what we had to do. The *Arabs*, finding us to come on with this Order and Reſolution, thought not fit to adventure on us; ſo we gained the Hill, from whence we might diſcern theſe vaſt and noble Ruins, having a Plain, like a Sea for Greatneſs, to the Southwards of it. Here having refreſhed our Men, we fetched a little

Compaſs, and deſcended by the Foot of a Mountain, on which ſtands a great Caſtle, but uninhabited. Here two *Arabs* came to us with Lances, one being *Chiab* to *Melkam*, and we ſent two to meet them; they gave the *Salam Alika*, and ours returned the *Alica Salam*, and advancing to our Company, told us, the *Emir* had underſtood of our coming, and had ſent them to acquaint us that he was our Friend, and that all the Country was ours. We ſent back with them our *Janizary* and a Servant to viſit the Prince in his Tents, which were in a Garden. In the mean time we diſmounted at a Watering-place amidſt the Ruins, but did not unload till our *Janizary* and Servant returned with the *Emir's Teſcarr*, aſſuring us of a Friendſhip and Protection, a Writing which the *Arabs* were never known to violate before. With them came alſo one that belonged to the *Sheck* of the Town, for whom we had Letters from *Uſeffe Aga* the *Emeen* of *Aleppo*. He deſired us for greater Security to pitch our Tents under the Town-Walls, which is in the Ruins of a great Palace, the Wall yet ſtanding very high, the Town within but ſmall, and the Houſes, excepting 2 or 3, no better than Hog-ſties. So we pitched in a deep ſandy Ground, where we found it exceeding hot. Here we waited till Three of the Clock without eating any thing, expecting the *Sheck* ſhould have preſented us, according to the uſual Cuſtom of the *Turks* to their Friends, and have given ſome Anſwer to the Letters we brought him; but on the contrary, we found by the Geſtures of the People that we had Reaſon to ſuſpect them. Hereupon two of our Company, believing that the Want of a Preſent to the *Emir* was the Cauſe thereof, reſolved to adventure to give him a Viſit, and taking the *Janizary* and one Servant, they carried him a Preſent of 2 Pieces of red Cloth, and 4 of Green, and ſeveral other things. Being come, he welcomed them into his Tent, and placed the one on his Right-hand, and the other on his Left. *Melkam* was a young Man, not above 25, and well featured, and a moſt excellent Horſeman; *Hamet Shideed*, the other Prince, was more elderly, about 40 Years of Age, and was not in the Tent, but ſat under a Palm-tree near it. He treated them with *Coffee*, *Camel's Fleſh*, and *Dates*; and inquired of their Journey, and the Cauſe of their coming: They told him it was only Curioſity to ſee thoſe Ruins. He ſaid that formerly *Solomon Ibn el Doud* built a City in that Place, which, being deſtroyed, was built again by a ſtrange People, and he believed that we, underſtanding the Writing on the Pillars, came to ſeek after Treaſure, he having but 6 Moons before found a Pot of *Corra Cruſſes*. After this he went out of the Tent, leaving them ſmoaking Tobacco, to the *Janizary* and Servant; and told them, that never till that Day any *Franks* had been at that Place, and that now we knew the Way through the Deſart, we might inform the *Turks*, to their Ruin and Deſtruction; ſo that it would be convenient for them to deſtroy us all; but that we coming as Friends, he would only have 4000 Dollars as a Preſent, elſe he would hang them and the two *Franks* up, and go fight the reſt. This Meſſage being brought them, they anſwered, they could ſay nothing to that Demand, not knowing our Minds: But if he would permit them to go and ſpeak with the reſt, they would return an Anſwer. Hearing this, he threatened preſent Death; but at length gave Leave to our *Janizary* to carry us a Letter from them, wherein they ſhewed the Danger they were in, and earneſtly intreated us to redeem them, the Price ſet upon them being 2000 Dollars; one half in Money, the other half in Goods, as Swords, Cloaths, Tents, &c. which the *Emir* promiſed to eſtimate at their Worth.

Upon the Receipt of this Letter we began to examine what Monies we had, Cloaths, and other Trade, and found that we could not near make up that Sum. In this Confuſion came Two *Arabs* to receive the Things, and immediately Word was brought that the *Emir* would come and viſit us: We ſent him Word, that if he came with more than two Followers, we would not admit him. So he came with two Servants only: And in Concluſion, we made him up in Money and Goods to the Value of 1500 Dollars; he valuing our Things as we pleaſed, his Deſign being not ſo much to complete the Sum, as to take from us all we had.

After this, about Sun-ſet, he returned us our two Friends. We kept good Watch in the Night, and the next Day we returned by the ſame Way we came, and arrived at *Aleppo*, *July* 29. in the Morning.

This and other the like Violences uſed by this *Arab* Prince, made the *Baſſa* of *Aleppo* reſolve to deſtroy him; not long after he cajolled him with the Hopes of being made King of the *Arabs*; and to draw him near the City, he veſted and careſſed ſome of his Followers: Which having its Effect, the *Baſſa* ſurpriſed him in his Tents by Night, and ſoon after he was put to Death. This thoſe People were willing to believe the Effect of their ſo abuſing the *Engliſh*, and might much contribute to the Security and good Uſage they found that went the ſecond Time on this Expedition.

We had not Time to view theſe Ruins by reaſon of this Uſage, though perhaps we might with Safety. We took only one of the Inſcriptions as we paſſed by; which was thus:

ϹεΠΤΙΜΙΟΝ ΑΥΟΡΟΔΗΝ ΤΟΝ ΚΡΑΤΙϹΤΟΝ
εΠΙΤΡΟΝ ϹεΒΑϹΤΟΥ ΔΟΥΚΗΝΑΡΙΟΝ
ΚΑΙ ΑΡ..ΑΠΗΤΗΝ ΙΟΥΛΙΟϹ ΑΥΡΗΛΙΟϹ ϹΑΝѠΗϹ
ѠΑϹϹΙΑΝΟΥ ΤΟΥ Ѡ..ΛεΝΑΙΟΥ ΙΠΠεΥϹ
ΡΟΥΜΑωΝ ΤΟΝ ΦΙΛΟΝ ΚΑΙ ΠΡΟϹΤΑΤΗΝ
εΤΟΥϹ ΗΟΦ ΜΗΝεΙ ΞΑΝΔΙΚω.

A ſecond Voyage *to* Tadmor; *by* .... *Communicated by Mr.* Tim. Lanoy *and Mr.* Aaron Goodyear, *ib.* p. 131.

As far as we could conclude from our Journies, and the Poſition of the Ways taken by two good Compaſſes, the Diſtance of *Tadmor* from *Aleppo* is about 150 *Engliſh* Miles, and the Courſe S. S. E. or rather ſomewhat more Southerly, conſidering the Variation of the Compaſs, which is about half a Point Weſtward in theſe Parts.

2. We ſet out from *Aleppo* for *Tadmor* on *Michaelmas-day* 1691. being in all, Maſters and Servants, 30 Men, well armed, having obtained a Promiſe of Security from *Aſſyne*, then King of the *Arabs*, and one of his own

People for a Guide. This Day our Road pointed S. by E. and in 4 Hours we came to a Fountain called *Caphir-Abiad*, leaving *Old Aleppo* about an Hour diſtant on the Right-hand. Here we made but a very ſhort Stay; but proceeded to a better Fountain, at the Foot of a very high Hill, covered with looſe Stones, the Ruins of a Village called *Broeder*, of which there was not one Houſe remaining; and dining here, we advanced in an Hour and a Quarter, through a fertile open Plain, to a Place called *Emghir*, famous for the beſt Wheat that is brought to *Aleppo*. This we made our firſt Stage; and mounting again in the Morning about 5 o'Clock, in leſs than an Hour we paſſed by an uninhabited Village called *Urghee*, our Road pointing as before, through the fruitful Plain, even and pleaſant: But when we came to aſcend the Hills, where I reckoned we entered the Deſart, we had a troubleſome Paſſage, over looſe great Stones, without any Appearance of a Road.

Our Guide had promiſed to conduct us through pleaſant Groves and Foreſts; but no ſuch Thing appeared, unleſs we ſhould beſtow that Name upon low withered Shrubs that grew in the Way; only one Tree we ſaw, which was of good Uſe to us, ſerving as a Landmark; and when we were come up with it, being left at a little Diſtance on the Right-hand, we gained the Proſpect of a remote Ridge of Hills before us, and on the Top of one of them an old Caſtle, known by the Name of *Gazar Ibn Wordan*. I ſoon turned my Eyes from it, to a little round Hill more on the Left, by which we were to direct our Courſe, and about a Quarter of an Hour from which ſtood a *Sheck*'s Houſe, called *Sheck Ailba*, with a Well of Water by it; but ſuch that we had but little Guſt to taſte, though it ſerved our Horſes. All the Country hereabouts is ſtored with *Gazels*, and there is a Sort of barbarous People there that have hardly any thing elſe to live upon but what of theſe they can kill; and Neceſſity has taught them to be no mean Artiſts in their Way. That Morning we had travelled about 5 Hours to reach *Sheck Ailba*'s; yet finding nothing to invite our Stay there (though there were 4 or 5 Tombs not ill made, according to the *Turkiſh* Mode) about one of the Clock we mounted again, bending to the South-Eaſt, or ſomething more Eaſterly. In our Way we had a remarkable Proſpect, on the Right-hand, of the Ruins of an antient City called *Andreen*, and ſometimes *Londrine*, which we were told had been formerly inhabited by *Franks*, and that there were many Inſcriptions there. We proceeded till Sun-ſet, very weary, and almoſt without Hope of coming to Water that Night, tho' at the ſame time near dead for Thirſt: And in an Hour's time more our Guide brought us to the Side of a Bog, called by the Name of *Zerga*, where we found Water enough; but it was neither palatable nor wholſome, neither did the Ground ſeem proper to ſleep upon; yet we were forced to be content, there being no removing thence that Night.

Oct. 1. We departed from *Zerga*, about 2 Hours before Sun-riſe, and, as ſoon as it was light, had the Proſpect of a very high Hill: To this we made as directly as we could look, finding nothing in our Way obſervable, except a Multitude of Holes made in the ſandy Earth, by Rats, Serpents, and other Animals, which rendered our Riding a little troubleſome, as we had found it upon the ſame Account the Afternoon before. About 2 Hours ſhort of our Stage, we were ſhewn 3 little round Hills, lying to the Right in a direct Line, known by the Name of *Tenage*; where we were told there was good Water, and it is for that Reaſon only they deſerve the Notice of thoſe that travel through ſuch a thirſty Deſart. The Place to which we directed our Courſe was called *Eſree*, where we arrived about 11 o'Clock, and found, to our great Satisfaction, excellent Water. Here we could diſcern the Foundations of a ſpacious City, and a Piece of a thick Wall built of chalky Stone was ſtanding: This we judged to be the Remainder of a Caſtle ſituated on the Side of the Hill, ſo as both to defend and command the City. On the Top of the Hill, above the Caſtle, ſtand the Ruins of a Fabrick, in Appearance very antient, built of a very hard Stone, yet exceedingly worn by the Weather. It is of an oblong Figure, pointing near to the N. E. and S. W. with only one Door on the Eaſterly End, which was once adorned with extraordinary good Carvings, of which there are ſtill ſome Remains; but the greateſt Part is either worn away, or purpoſely defaced; and thoſe Marks of antient Beauty that remain are obſcure, and ſcarcely diſcernible.

The Outſide of the Walls is beautified with Pilaſters quite round, with their Pedeſtals and Capitals regular and handſome; but the Roof is fallen down, and within appears nothing which looks either great or beautiful. The Situation, and placing the Door, hinders one from conjecturing it to have been a Chriſtian Oratory, or Chapel; and therefore in Probability it muſt have been a Heathen Temple; and if ſo, then the Piece of the Caſtle-Wall, being of a ſofter Stone, muſt be much more modern. The Goodneſs of the Water brings the *Arabs* (who rove up and down the Deſart) and the *Turkmen* frequently hither; which has occaſioned a great many *Graves* about the Temple; and ſome have had Leiſure, and (which is more difficult to be imagined) Skill enough to ſcratch in the Walls the firſt Letters of their Names, and many more in *Arabick* Characters, which we could make nothing of, no more than of an *Arabick* Inſcription which lay hard by, but appeared not antient.

Oct. 2. We departed from *Eſree* about an hour and an Half after Midnight, and in 6 Hours and an Half arrived at Two Wells, the Water 18 Fathom and 2 Foot deep, known by the Name of *Imp Malcha Giub*. Through the greateſt Part of this Stage we had a broad beaten Road; and where that was not diſcernible, we guided ourſelves by a Ridge of chalky Hills, under which the Wells lay. The Water we found exceeding bad, and of ſo noiſome a Scent, that we could not endure it ſo much as at our Noſes.

In our Way hither we were ſhewn the true Plant which they burn for Soap-Aſhes, which has no Leaves, but a ſoft juicy Stalk, ſhooting into ſeveral Branches, and ſomething reſembling our Samphire, only it is more round than that. The Aſhes likewiſe we ſaw, which were made not far from the Wells, which in burning run into Cakes, not much unlike the Cinders of a Forge; only they are heavier, and not ſo full of Pores, nor ſo hard as they are. In the Afternoon we proceeded on our Voyage 2 Hours and an Half, to a Place called *Almyrrba*, paſſing rather between than over the Hills, though we had ſomething of an Aſcent too. Our Journey hitherto had been altogether Southerly, and but little varying to the Eaſtward of due South.

Oct. 3. We mounted from *Almyrrba* between 5 and 6 in the Morning, making to the Point of a high Ridge of Mountains, through an uneven deſart Way: We came to the Aſcent after about 4 Hours Travel, which we found not difficult; and when we were on the Top, we had a pleaſant Proſpect of the Country. This Mountain was covered on both Sides with great Plenty of Turpentine-trees, which was an Object very pleaſing, having ſeen very few Greens in our whole Journey. This Tree grows very thick and ſhady, and ſeveral of them we ſaw loaded with a vaſt Abundance of a ſmall round Nut, the chief Uſe whereof is to make Oil; tho' ſome eat them, and account them as great à *Regalio* as Piſtaches. Their outward Husk is green, and more oily than that of Piſtaches, and within a very thin Shell, a Kernel both in Colour and Reliſh very much reſembling them: But thoſe that eat them ſeldom take the Pains to ſearch for the Kernels, but eat Husk and Shell all together, which have no ungrateful Taſte. From this Hill we had a tedious Deſcent, and coming at the Foot into a narrow Gut, winding this Way and that between the Mountains, our Paſſage ſeemed very long, hot, and tireſome: Our want of Water however obliged us to proceed, whereof we now began to be in great Neceſſity, eſpecially for our Horſes and Mules, who had none the Night before, nor none at all that Day.

About Two o'Clock in the Afternoon a ſmall drizling Rain, which we had about Half an Hour, increaſed to a very plentiful Shower, which put us upon producing all the Veſſels we had to catch it as it fell from the Heavens, or ran down the Skirts of our Tents; our Horſes at the ſame time greedily drinking it from the Ground. But we might have ſpared our Pains, for in leſs than Half an Hour's Time our Camp was in a manner afloat, and we were ſurrounded with Water not only ſufficient for us, but for an Army of 20,000 Men: Thoſe hollow Guts which we paſſed over without the leaſt Appearance of Moiſture, were, by the Cataracts which deſcended from the Mountains, become Rivers; ſo plentifully was God pleaſed to provide for us in our greateſt Streight; and which increaſes both the Wonder and Mercy, the next Morning all this great Quantity of Water was paſſed away; ſo that in about Two Hours riding we could hardly perceive that there had been any Rain at all. This memorable Place is known by the Name of *Al-Wiſhal.*

Octob. 4. From *Al-Wiſhal* we proceeded for *Tadmor*. Our Way lay Southward; but the Gut in which we travelled would not permit us to keep a direct Courſe. However, in about an Hour's Walk we paſſed by *Antor* Mountains (our Guide called them *Toul Antor*) thro' a Gut or Rent, both Sides of which ſo directly anſwered one to the other, they would tempt a Man to believe they were ſeparated by Art, for an Entrance into the Country. But

almoſt

almoſt as ſoon as we were well got within the open Space, we were obliged to aſcend another Hill, and ſo our Road continued over Hills and Valleys interchangeably all the Way. We had hardly proceeded 4 Hours, when we came to the Brow of a rocky Mountain, ſeparated from that whereon ſtands the *Caſtle* of *Tadmor*, but by a narrow Valley: In which Hill, by the Way, appeared ſome Quarries of fine Stone, which probably might afford Materials to the curious *Buildings* in the City; where we ſoon after arrived.

Fig. 63. Having tired ourſelves with roving from Ruin to Ruin, and rummaging among old Stones; and more eſpecially not thinking it ſafe to linger too long in a Place, where ſhould the *Mountain Arabs* (who were Enemies to *Aſſyne Abbaſſe*, our Friend) have Intelligence of us, they might either fall upon, or endeavour to intercept us in our Return;

On *Thurſday*, *Oct.* 8. about half an Hour after 4 in the Morning, we departed from *Tadmor*, being very well ſatisfied with what we had ſeen, and glad to have eſcaped ſo dreaded a Place, without any Trouble or Pretences upon us: But elſe with ſome Regret, for having left a great many Things behind, which deſerved a more particular and curious Inſpection. Our Road lay almoſt due Eaſt, or a little inclining to the North; and on the Left-hand, a Ridge of Hills ſtretched along for a great Space, ſometimes about half an Hour diſtant from the Road, and ſometimes opening wider. Theſe Hills, we were told, were ſtored with rich Veins of divers Minerals, and afforded all that vaſt Quantity of Marble, the Remains whereof we had ſeen at *Tadmor*: And it was from a Fountain called *Abulfarras*, at the Foot of one of them, they fetched out Water which we drank there; the Inhabitants contenting themſelves with that which runs from the hot Springs. To the Right-hand lay a moſt barren Plain, perfectly bare, and hardly any thing green to be ſeen therein, except it were a few Gourds, which our Servants found on the Side of a little riſing Ground, where there was no Shew of any thing moiſt to feed them. Our Way being plain, we had the Sight of *Tadmor*, eſpecially the Caſtle, for above half our Stage, till we came to an old *Caphar* Houſe. We made indeed a very ſhort Day's Journey in the whole, finding a Fountain of excellent Water in about 5 Hours and a half's Riding; which, as it was a moſt welcome Refreſhment to us in ſuch a thirſty Deſart, ſo it was the only good Water we met with till we came to *Euphrates*, which was not till the third Day from this Place. At this Fountain we pitched, near to which is a Village, but almoſt wholly ruined and deſerted. 'Twas ſome time before any body would be ſeen, for they were afraid of us: At length three Men came out to our Tents, Spectacles of a miſerable Poverty, occaſioned by their being frequently pillaged by the *Mountain Arabs*, and a great Duty they pay to *Aſſyne Abbaſſe* their King, for his Protection. Three hundred Dollars they pay him annually, when one would think the whole Village was not able to make up the Sum of One hundred: Yet being the remoteſt Place that was under his Juriſdiction, they often ſuffer by the Inroads of the others. The Name of the Place is *Yarecca*, a Name it received (as we were informed) from a Victory obtained there by the *Turks* over the *Mamalukes*.

Oct. 9. From *Yarecca* we mounted early, and travelling N.E. or near that Point, in 7 Hours time arrived at *Soukney*. The Road we found much like what we had the Day before, lying over a barren Plain; only we had Hills on both Sides, and ſometimes cloſing within half an Hour's riding one of the other. The Village has its Name from the *Hot-Waters* (for ſo the Word imports), which are of the ſame Nature with thoſe of *Tadmor:* Herein they bathe frequently, the ſame little dirty Hole ſerving both for Men and Women; only they have ſo much Modeſty remaining, that they have different Hours for the one and the other. To ſay the Truth, 'twas the only Mark of Modeſty: in other reſpects, they ſeemed a confident, or rather impudent, Generation of People. Before we could pitch our Tents, they flocked about us in Multitudes, Men, Women, and Children; and of the laſt, many of them as naked as ever they came into the World, not ſo much as a Rag about them to cover them; and ſo numerous they appeared, that if we had Reaſon to think *Yarecca* wanted Inhabitants, we had no leſs to conclude *Soukney* over-ſtocked. At this Place uſually reſides an Officer of *Aſſyne*'s, who is their Sub-Baſſa, or Governor: He whom we found there was called *Dor*, of a good Family among the *Arabs*, to whom we made a Preſent, and he civilly returned it in Barley for our Horſes. Afterwards he came under our Tents, and invited us to an Entertainment; which, conſidering the Circumſtances of the Place, was very ſplendid, though it was nothing but *Pilaw* at laſt, a little diverſified by the Dreſſing; and, to ſpeak truly, I judge we could not have leſs than a Buſhel of Rice ſet before us. His Palace indeed was not very ſtately, there being few Cottages in *England* but might vie with it. To the Room wherein we were entertained, which doubtleſs was the beſt, if not the only one he had, we were forced to clamber, rather than aſcend, by broken Steps made of Stone and Dirt. When we were got in, and commodiouſly ſeated after the *Turkiſh* Mode, it ſeemed large enough for about a Dozen or Fourteen People: At the upper End was a little Space, ſeparated from the reſt by a Ridge made up of Earth, within which I ſuppoſed he ſlept. The Walls were mean, but the Roof much worſe, having no other Covering but Faggots; ſo that certainly it could not be Proof againſt a Shower of Rain: However, it ſerved well enough for our Afternoon's Collation; and we had come away with a good Opinion of the Gentleman's Civility, had he not afterwards endeavoured to make a Pretence upon us, and ſo would have forced us to pay dear for our Rice: He pretended to a cuſtomary Duty of a Chequin a Head of all *Franks* that paſſed that Road; though probably neither he, nor his Grandfather before him, had ever ſeen a *Frank* there before. But when he underſtood by our Guide, that we were not ſo eaſily to be impoſed upon; and withal, that we were *Aſſyne*'s Friends, and in our way to his Tents; and eſpecially our Treaſurer, a Perſon he very much eſteemed, who therefore would be ſure to acquaint him with any Exaction or Injury offered us; his Mouth was quickly ſtopt, and he grew ſo ſenſible of his Error, that he ſent to excuſe it, and preſented our Treaſurer with a Fan of black Oſtrich Feathers, and in the Morning came himſelf, and conducted us about an *Hour* on our Way. This Village pays to *Aſſyne* 1500 *Dollars per Annum.*

Oct. 10. Continuing our Voyage ſtill to the N. E. or ſomething more *eaſterly*, we found it another pleaſant and eaſy Stage to another Village called *Tiebe*, ſo called (as they ſay) from the Goodneſs of the *Waters*, the Word ſignifying Good: But we found them not ſo over-excellent; they had the Taſte, and were doubtleſs tinctured with the ſame *Mineral* with thoſe of *Soukney* and *Tadmor*, though not ſo ſtrong. But the Village itſelf made a better Shew than uſual; and the People appeared of ſome better Faſhion, and more civilized than thoſe we had left. 'Tis pleaſantly ſituated, and makes a good Appearance as one comes up to it; the Proſpect being helped by a well-built *Steeple*, to which is now adjoined their *Moſque*: But I am apt to believe it the *Remains* of a *Chriſtian Church*, being built with ſome more Art and Beauty than you ſhall eaſily find in *Turkiſh* Fabricks: And there are alſo ſeveral *Ruins* about it, which ſpeak it to have been a more famous Place than now it is. Into the *Moſque* we were permitted to enter without any Diſturbance. This Village lies in one of the Roads from *Aleppo* to *Bagdat*, and pays to *Aſſyne* an *annual* Tribute of 1000 *Dollars*. From hence we mounted again in the Afternoon, and proceeded about 2 *Hours* and a *half* farther; having travelled this Day in all about 7 or 8 *Hours*. The Place we pitched at was a *Fountain*, and known by the Name of *Alcome*; but neither Town nor Houſe by it; neither was the *Water* fit to be drank, being of the ſame Nature with that of *Soukney*, and almoſt as *warm*.

Oct. 11. From *Alcome* we roſe about an *Hour* and a *half* after Midnight, our Guide groping out the Way by the Help of the Stars, which now bended more to the *North* than formerly. As ſoon as it was light enough to look about us, we found ourſelves in a wild open *Deſart*, the Ground in ſome Places covered with a Sort of *Heath*, and in others quite bare: Nor had we travelled long after the Sun was up, before, by the Help of a riſing Ground, we diſcovered *Arſoffa*; but it was after 10 o'Clock before we reached it: And finding no Water any-where near, we were neceſſitated to proceed forward for the River *Euphrates*, which we found 4 *Hours* diſtant from it. *Arſoffa*, or (as the *Arabs* call it) *Arſoffa Emir*, ſeems to be the *Remains* of a *Monaſtery*, having no Town nor Village near it, and being one continued Pile of Building of an oblong Figure, ſtretching longways *Eaſt* and *Weſt*, and incloſing a very capacious *Area*. At a Diſtance it makes a glittering Shew, being built of *Gypſing-Stone*, or *Rock-Iſinglaſs*, reſembling *Alabaſter*, but not ſo hard; ſeveral Quarries of which we paſt by in our Way to it. When the Sun ſhines upon it, it reflects the Beams ſo ſtrong, that they dazle the Eyes of the Spectators. Art or Accuracy in the Workmanſhip we found none, and but very little *Carved* Work, and that mean enough; nay, the very Cement they made uſe of, is but little better than Dirt: So that it's no great Wonder to ſee it in *Ruins*, though it has not the Appearance of any great Antiquity. Round about were the little *Apartments* or *Chambers* for the *Monks*, built *Arch-wiſe*, only one

Story above Ground; but underneath are ſeveral *Cells* or *Vaults*, larger than the *Chambers*, which perhaps might ſerve for their *Schools*, or *Working-Houſes*. In the Midſt of the *Area* ſtand the *Ruins* of ſeveral Buildings, ſome of which ſeem to have been *Ciſterns* for *Water*; and it may be the *Bathing-places*: But the moſt remarkable was one, which probably was the *Abbot*'s, or *Biſhop*'s Houſe, there having been ſome more Pains beſtowed upon it than the reſt; and another, which was the *Reliques* of their *Church*. This was formerly no unhandſome Structure, being built in the Form of our *Churches*, and diſtinguiſhed into three *Iſles*, of which the Middle one is ſupported by 18 turned *Marble Pillars*, with *Capitals* upon them, not of *Marble*, but of a Sort of *Clay*, and *caſt* into the Shape they are in, but of a *Colour* exactly reſembling the *Pillar* itſelf. That which perſuades us to believe them *caſt*, is a *Greek Inſcription* to be ſeen on all of them; the *Letters* whereof are not made by *Inciſion* in the Stone, but ſeem to be ſtamp'd, ſtanding out higher than the Diſtance between them; and on one of them, by Miſtake, they are ſo placed, as to be read after the *Oriental* Manner, from the Right-hand to the Left. The Words are theſe, with the *Crucifix* before, as follows:

✠ ΕΠΙ ΣΕΡΙȣ ΕΠΙΣΚ° Τȣ ΣΥΝΓΕ`Ν ΜΑΡωΝΙȣ Τε ΧωΡΕΠΙΣΚ°·

From hence our Guide led us to the *River*, by the Aſſiſtance of two little Hills, which are known by the Name of *Aſſ-Dien*; our Way lying *North*, and a little bending to the *Eaſt*. The Sight of the *River* was a very pleaſing Proſpect: And to our great Comfort we found the Water very clear, happening to be there before the *Rains*, and after the *Snow-waters* (which ſwell and diſturb it in the Summer-time) were all paſt. We pitched upon the *Reach* of the *River*, where it was not very broad, not being above *half* a *Muſket-ſhot* over.

Oct. 12. This Morning about Sun-riſe we proceeded on our Voyage, keeping along the Banks of the *River*, which for the moſt part led us *Weſt* and *North-Weſt*: And here we had pleaſant Travelling, having the *River* on the Right-hand, and Hills of *Marble*, or other fine Stone, on the Left; and delightful Groves of *Tamariſk*, *Mulberry*, and other Trees, to paſs through. Here every thing about us looked freſh and verdant; and we met frequently Men and Women paſſing on their Occaſions, a thing to which (in our former Stages) we had not been accuſtomed. We had alſo a pleaſing Proſpect of the oppoſite Shore, and could ſee a great Way into *Meſopotamia*: But we could meet with no Convenience to croſs the *River*. There are no Places of Note remaining upon the *River*, either on one Side or the other; only on the farther Side we ſaw an old *Caſtle*, called *Giabar*, which made a good Shew, being ſituated on the Top of a Hill, and both for that, and the Way of Building, very much reſembling that of *Aleppo*; only that is the larger, and in the midſt of a City; this leſs, and has neither Town nor Houſes about it. On our Side we paſt by a *Sheck*'s Houſe; called *Abul-Rarra*, and the *Ruins* of a Town a little farther, where there was a *ſquare*

Tower,

Tower, built of very ordinary Brick, but pretty intire. After we had left theſe Ruins, we reſted to 'bate under the Shadow of a Rock, wherein were many Apartments and Conveniencies cut to lodge in; which, I ſuppoſe, are made uſe of in the Winter by the People, who, during the Summer, pitch among the Trees by the River-ſide. In the Afternoon we continued our Journey as before, keeping always at a little Diſtance from the River, till a little before Sun-ſet, having travelled 7 or 8 Hours the whole Day.

Oct. 13. This Day we had the ſame Satisfaction as the Day before, proceeding as near the River as the Road would permit: And having made a Stage of about 6 Hours, we reſted under the Shade of the Tamariſk-Trees by the River-ſide. In our Way we ſaw the Ruins of a City called *Baulus*, where the *Turks* had formerly a *Sangiac*: But now there is never an Inhabitant in the Place, nor a Houſe ſtanding, but the Ruins of Houſes, and an octagonal Tower of a conſiderable Height, *viz.* 107 Steps, and beautified on the Outſide with Flouriſhes, and an *Arabic* Inſcription round about. It is a handſome Structure, and probably the Work of the *Mamalukes*, ſince whoſe Time little has been done to adorn, but abundance to deſtroy and waſte this Country. After Dinner we mounted ſooner than ordinary, becauſe, hoping to reach the Tents of *Aſſyne*, we were unwilling it ſhould be late when we arrived; yet we made it near Sun-ſet before we got to *Fay*, a Fountain by which he lay. We had travelled ſtill on the ſame Point N. W. with the Proſpect of the River the greater Part of the Way, the neareſt Reach thereof not being above an Hour's riding from the Fountain. On the Road we met with ſeveral *Banderas* of the *Emir*'s Soldiers; who, knowing our Guide, and underſtanding we were going to him, gave us a very courteous *Salam*; who elſe, perhaps, might have treated us with another Sort of Civility. The King's Tents ſpread over a large Plain, and took up ſo vaſt a Space, that, though we had the Advantage of a riſing Ground, we could not ſee the uttermoſt Extent of them. His own particular Tent was pretty near the Middle of the reſt, which were pitched about it, not in a circular Manner, but ſtretching out in Length as the Plain opened; or, for the better Conveniency of a Current of Water, which from the Fountain ran through the midſt of them. 'Twas not at all diſtinguiſhable from the reſt, but by its Bigneſs, and a little more Company about it; being all made of a Sort of Hair-cloth. It cannot well be doubted but they are deſcended from the old *Arabes Scenitæ*, they living juſt after the ſame manner, having no ſettled Abode, but remove from Fountain to Fountain, as they find Graſs for their Sheep and Camels, and Water for them and themſelves. They love to derive themſelves from *Iſhmael*, the Son of *Abraham*.

As ſoon as we alighted, we were attended by the Officers of the *Emir*, and conducted to a very noble Tent, built after the *Turkiſh* Mode, and pitched next to his own. Hither he ſent to bid us welcome, and to inquire how we had paſt in our Voyage; and preſently after we had a Repaſt of ſeveral Diſhes of Meat ſet before us, to ſtay our Appetites, till a more plentiful

tiful Supper could be got ready. But before Supper the *King* himſelf made us a Viſit in Perſon, bidding us welcome to *Fay*, and aſking what we had ſeen in our Travels that pleaſed? how we liked *Tadmor?* and whether we had found a Treaſure there? For this Notion ſticks in the Heads of theſe People, that the *Franks* go to ſee old Ruins, only becauſe they there meet with Inſcriptions which direct them to ſome hid Treaſures. And therefore it is no unuſual thing with them, when they find a Stone with an Inſcription on one Side, to turn that down to the Ground, that it might not be ſeen or read of any. But we aſſured him we went with no ſuch Expectations, but only out of a Deſire to ſee the Place: Neither had we brought any-thing away with us but a Piece of Porphyry Stone, which, upon his Requeſt, we ſhewed him. We let him ſee too a kind of rude Draught which we had taken of the Place, which he ſeemed to like. He made his Viſit the ſhorter, that he might not incommode us after our Journey; but deſired us we would live after our own Pleaſure, and to our Satisfaction, and command freely whatever the Camp would afford; ordering ſome of his People conſtantly to attend upon us. When there was mention made of our Deſign to be gone the next Morning, he anſwered, it muſt not be; himſelf was invited, the next Day, to a great Entertainment, by one of his Grandees, and we ſhould accompany him; but the Day following he would go out with us, and hunt Part of our Way towards *Aleppo*. When Supper was brought in, there was Victuals enough for three times our Number; a large Diſh of *Pilaw* in the Middle, and 12 or 13 Diſhes of ſeveral Sorts of Meat about it, all dreſſed after their Manner, but exceeding good. After we had eat and drank what we pleaſed, we roſe up, and our Servants ſat down in our Places, it being the Cuſtom of the *Arabs*, and *Turks* too, from the higheſt to the meaneſt, all to eat at the ſame Table. The beſt Sort ſit down firſt, and ſo in Order till all are ſatisfied, and then what remains is carried away. We might, if we had pleaſed, have lodged under the ſame Tent where we eat; but having Tents of our own pitched, ſome of our Company choſe rather to retire thither, to avoid being diſturbed by too many Viſitants.

Oct. 14. The next Morning, about Ten o' Clock, we were told that the King was gone to the Entertainment, and expected we ſhould follow him; and that two young Camels were killed to furniſh this ſumptuous Feaſt; which is the higheſt Piece of Magnificence and Greatneſs to which theſe People, whoſe greateſt Riches conſiſt in Camels, can arrive. The Tent was about a Furlong from ours; ſo mounting our Horſes we rode to it, and found it ſurrounded with a numerous Train of Gueſts, 300 at leaſt, of different Sort and Quality. It was very large of itſelf; and, to be ſtill more capacious, it was left open toward the Weſt. The King was ſeated at the North End, about the Midſt of the Tent, upon a Place raiſed with Cuſhions and Quilts, and Carpets before him; neither did he ſit croſs-legg'd, as all the reſt of the Company were obliged to do, but in a leaning Poſture. They ſeemed to obſerve an exact Order in their Places; and when any Perſon of Note entered, thoſe that were near his Place roſe up, and ſtood till he had ſeated himſelf. But the far greateſt Part could not come within the Compaſs of the Ring, but ſtood behind the Backs of the reſt, leaving a ſpacious *Area* vacant in the middle. When we entered, they made Room for us on the *King's Left-hand*, which here is eſteemed the more honourable; where we ſat down in the ſame Poſture with thoſe about us, *Croſs-legged*, upon a thin *Carpet*. Before Mid-day a Carpet being ſpread in the middle of the Tent, our Dinner was brought in, being ſerved up in large wooden Bowls between two Men; and truly, to my Apprehenſion, Load enough for them. Of theſe great Platters there were about 50 or 60 in Number, perhaps more, with a great many little ones, I mean, ſuch as one Man was able to bring in, ſtrewed here and there among them, and placed for a Border or Garniſh round about the Table. In the middle of all was one of a larger Size than all the reſt, in which were the *Camels Bones*, and a thin *Broth* in which they were boiled: The other greater ones ſeemed all filled with one and the ſame Sort of Proviſion, a kind of *Plum-Broth* made of *Rice*, and the fleſhy Part of the *Camel*, with *Currans* and *Spices*, being of ſomewhat a darker Colour than what is made in our Country. The leſſer were, for the moſt part, charged with *Rice*, dreſſed after ſeveral Modes, ſome of them having *Leben* (a thick ſour Milk) poured upon them. *Leben* is a thing in mighty Eſteem in theſe hot Countries, being very uſeful to quench *Thirſt*: And truly we had need of it here; for I did not ſee a Drop of any ſort of *Liquor*, excepting a Diſh of *Coffee* before Dinner, drank at this ſplendid Feaſt. *Knives*, *Forks*, *Spoons*, *Trenchers*, &c. are ſilly impertinent Things in the Eſteem of the *Arabs*: However, we being known to make uſe of ſuch things, had large wooden Spoons laid before us. When the Table was thus plentifully furniſhed, the *King* ariſing from his Seat, went and ſat down to that Diſh that was directly before him; and ſo did the reſt, as many as it would contain; which could not be much ſhort of 100; and ſo without any further Ceremony they fell to, thruſting their Hands into the Diſhes, and eating by Handfuls. Neither was there any occaſion of *Carving*; only becauſe thoſe Diſhes in the middle were too remote to be reached, there was an Officer on purpoſe, who ſtepping in among them, and ſtanding in Places deſignedly left for that End, with a long Ladle in both his Hands, helped any one according to their Deſires. When the *King* had eaten what he thought fit, he roſe up and waſhed, and retired back to his former Seat; and we alſo did the like, others being ready to fill our Places. Nor did we continue much longer under the *Tent* in that numerous Croud; for *Aſſyne* perceiving us a little uneaſy, and ſuppoſing we had now ſufficiently ſatisfied our Curioſity, though perhaps not our Appetites, told us, we might take our Liberty, and, if we thought fit, retire to our Tents. This Favour we gladly accepted, and without Ceremony returned, ſeveral of his Attendants waiting upon us back. Here we had another Dinner ſet before us, and having ſome of our own Wine and Water to drink with it, it went down better with us than the famous *Camel-Feaſt*. In the Evening, the *King* mounted to ſee the Flight of a new *Hawk*, and ſtayed abroad very late, his *Hawk* flying away; but ſhe was afterwards taken up by his *Falconer*; otherwiſe he had not been in a good Humour all that Night, being a Man that delights very much in Sport. After his Return from *Hawking*, we went to wait upon him at his own Tent, to return him Thanks for his moſt courteous and royal Reception of us, and to deſire Leave to depart the next Morning. Here we found him ſurrounded with the chiefeſt of his People; and being placed again on his *Left-Hand*, he entertained us with a great deal of pleaſant Diſcourſe, and aſked ſuch Queſtions as ſhewed him to be a Man of extraordinary Capacity and Judgment. As for Learning, they have no ſuch thing among them, and therefore it is not to be expected that he ſhould be a Scholar: But were he not a Perſon of more than common Prudence and Underſtanding, he could never have managed that wild and unruly People as he has done ever ſince his Advancement to the Throne; which muſt therefore have been the more difficult, becauſe as he came to it by the *Depoſition* of his *Father* (though not immediately) who now lives with him as a private Man, ſo has he never wanted Competitors. To his *Father* he pays a great deal of outward Reſpect, but is forced to keep a very watchful Eye over him. After about an Hour's Diſcourſe, we were diſmiſſed.

Oct. 15. In the Morning, *Aſſyne* not being at leiſure to go a *Hunting*, we proceeded on our Voyage homewards, with a great deal of Alacrity; and in about three *Hours* and a *half* arrived at *Seray*: And hence, after a ſhort Repaſt, we continued our Journey to *Sherby Fountain*, which took us up about the like Space of Time. Here we accounted ourſelves as good as at Home, being at a Place with which we were well acquainted, and to which ſeveral times in the Year ſome or other of our Nation uſually reſort, either for *Gazel* or *Hog-hunting*, according to their Seaſon; nor had we hence above 7 or 8 *Hours* to *Aleppo*.

Oct. 16. Getting up pretty early in the Morning, we reſolved to hunt the greateſt Part of our Way home, as we did; and dining at the famous *Round-Hill*, whereon has been ſpent by the *Engliſh*, more Money than would purchaſe a noble Eſtate round about it, in the Afternoon we arrived at *Aleppo*.

An Account of Tadmor; *by Mr.* Will. Halifax. *n.* 217. *p.* 83.

3. We departed from *Aleppo* on *Michaelmas-day*, 1691, and in 6 eaſy *Days* Travel over a *deſart* Country, came to *Tadmor*. As we rode into the Town, we took notice of a *Caſtle* about *half* an *Hour's* Diſtance from it, and ſo ſituated as to command both the Paſs into the Hills by which we entered, and the City too. But we could eaſily perceive it was no *old Building*, retaining no Foot-ſteps of the exquiſite Workmanſhip and Ingenuity of the *Antients*. Upon Inquiry, we were informed that it was built by *Man-Ogle*, a Prince of the *Druces*, in the Reign of *Amurath* the *Third*, A. D. 1585. But I know not how to give much Credit to this Story, becauſe I find not that either *Man-Ogle*, or any *Drucian* Prince, was ever powerful in theſe Parts, their Strength lying on Mount *Libanus*, and along the Coaſt of *Sidon*, *Berytus*, &c. It is a Work of more Labour than Art, and the very Situation alone is enough to render it almoſt impregnable; ſtanding on the Top of a

very high Hill, incloſed with a deep Ditch, cut out of the very Rock, over which there was only one ſole Paſſage by a Draw-bridge: This Bridge too is now broken down, ſo that there is no Entrance remaining, unleſs you will be at the Pains to clamber up the Rock, which is in one Place feaſible, but withal ſo difficult and hazardous, that a ſmall Slip may endanger one's Life. Nor is there any-thing within to be ſeen ſufficient to recompenſe your Trouble of getting up to it, the Building being confuſed, and the Rooms very ill contrived. Upon the Top of the Hill there is a Well of a prodigious Depth; as certainly it muſt be a great way to come at Water from the Top of ſuch a Rock, the Ditch that ſurrounds it not having the leaſt Appearance of Moiſture therein; which made it therefore ſeem more ſtrange, that a wild Boar ſhould ruſh out thence amongſt our Horſes, when we rode up to take a more particular View of the Place.

This Caſtle ſtands on the North Side of the Town; and from hence you have the beſt Proſpect of the Country all about. You ſee *Tadmor* under you, incloſed on three Sides with long Ridges of Mountains, which open towards the East gradually to the Diſtance of about an Hour's riding; but to the South ſtretches a vaſt Plain, beyond the Reach of the Eye. In this Plain you ſee a large Valley of *Salt*, affording great Quantities thereof, and lying near about an Hour's Diſtance from the City. And this more probably is the *Valley of Salt*, mentioned 2 *Sam.* viii. 13. where *David* ſmote the *Syrians*, and ſlew 18,000 Men, than another which lies about four Hours from *Aleppo*, and has ſometimes paſt for it. The Air is good, but the Soil exceeding barren, nothing green to be ſeen therein, ſave ſome few Palm-Trees in the Gardens, and here and there about the Town. And from theſe Trees I conceive it obtained its Name, both in *Hebrew* (*Tadmor*, which ſignifies a Palm-Tree) and in *Latin* (*Palmyra*) and the whole Country is thence denominated *Syria Palmyrena*; and ſometimes *Solitudines Palmyrenæ*: So that the *Latins* did not change, but only tranſlate the old Name, which therefore ſtill obtains in theſe Eaſtern Parts, and the more modern is wholly unknown. The City itſelf appears to have been of a large Extent, by the Space now taken up by the Ruins; but there are no Footſteps of any Walls remaining, nor is it poſſible to judge of the antient Figure of the Place. The preſent Inhabitants, as they are poor, miſerable, dirty People, ſo they have ſhut themſelves up, to the Number of about 30 or 40 Families, in little Huts made of Dirt, within the Walls of a ſpacious Court, which incloſed a moſt magnificent Heathen Temple. Hereinto alſo we entered, the whole Power of the Village, if I may ſo call it, being gathered together at the Door, whether to ſtand upon their Defence, in caſe we proved Enemies (for ſome of them had their Guns in their Hands), or out of mere Curioſity to gaze upon us, I know not. However, our Guide, who was an *Arab*, whom *Aſſyne*, their preſent King, had ſent to conduct us through the whole Voyage, being a Man known among them, we had an eaſy Admittance, and, with a great many Welcomes in their Language, were led to the *Sheck*'s Houſe, with whom we were to make our Abode. And to mention here what the Place at firſt View repreſents; certainly the World itſelf cannot afford the like Mixture of *Remains* of the greateſt *State* and *Magnificence*, together with the Extremity of *Filth* and *Poverty*. The neareſt Parallel I can think of, is that of the *Temple* of *Baal*, deſtroyed by *Jehu*, and converted into a *Draught-Houſe*. And if, what is not improbable, this very Place was a *Temple* of *Jupiter Belus*, the Similitude will run upon all four.

The whole incloſed Space is a *Square* of 220 *Yards* each Side, encompaſſed with a high and ſtately *Wall*, built of large ſquare Stone, and adorned with *Pilaſters*, within and without, to the Number (as near as we could compute by what is ſtanding of the *Wall*, which is much the greater Part) of 62 on a Side. And had not the Barbarity of the *Turks*, Enemies to every thing that is *Splendid* and *Noble*, out of a vain Superſtition, purpoſely beat down thoſe beautiful *Cornices*, both here and in other Places, we had ſeen the moſt curious and exquiſite *Carvings* in *Stone*, which perhaps the World could ever boaſt of; as here and there a ſmall *Remainder*, which has eſcaped their Fury, does abundantly evidence. The *Weſt-ſide*, wherein is the Entrance, is moſt of it broken down, and near the Middle of the Square, another higher *Wall* erected out of the *Ruins*; which ſhews to have been a *Caſtle* ſtrong, but rude; the old Stones, and many *Pillars* broken or ſawn aſunder, being rolled into the Fabrick, and ill cemented. Within were to be ſeen the *Foundations* of another *Wall*, which probably might anſwer the *Front*; and that the *Mamalukes*, whoſe Workmanſhip it ſeems moſt likely to have been, built the *Caſtle* here for the Security of the Place. Before the whole Length of this new Front, except a narrow Paſſage, which is left for an Entrance, is cut a deep *Ditch*, the Aſcent whereof on the Inner-ſide is faced with Stone to the very Foot of the *Wall*, which muſt have rendered it very difficult to have aſſaulted it. The Paſſage to, and the Door itſelf is very narrow, not wider than to receive a loaded *Camel*, or that two Foot-men may well walk a-breaſt. And as ſoon as you are within the firſt Door, you make a ſhort Turn to the Right, and paſs on to another of the like Bigneſs, which leads into the *Court*. But all this is but a new Building upon an old, and by this outward Wall is quite ſhrouded that *Magnificent Entrance* which belonged to the firſt Fabrick; of the Statelineſs whereof we were enabled to judge by the two Stones which ſupported the Sides of the great *Gate*, each of which is 35 *Foot* in Length, and artificially *carved* with *Vines* and *Cluſters* of *Grapes*, exceeding bold, and *to the Life*. They are both ſtanding, and in their Places; and the Diſtance between them, which gives us the Wideneſs of the *Gate*, 15 *Foot*. But all this is now *walled* up to the narrow Door before-mentioned. Over the little Door there is an *Inſcription* in *Greek*, and alſo another in another *Language* and *Character*, which I never ſaw till in *Tadmor*, nor underſtand what to make of it. From that in *Greek* we hoped for ſome Information; but it will be evident to any one that reads it, that the Stone was brought from another Place, and caſually put in there. 'Tis thus:

ΤΟ ΜΝΗΜϵΙΟΝ ΤΟϒ ΤΑφϵωΝΟϹ ϵΚΤΙϹϵΝϵΞΙΔΙωΝ
ϹϵΠΤΙΜΙΟϹ ΟΔΑΙΝΑΘΟϹ Ο ΛΑΜΠΡΟΤΑΤΟϹ
ϹϒΝΚΛΗΤ [ΙΚΟϹ] ΑΙΡΑΝΟϒ Οϒ ΑΒΑΛΛΑΘΟϒ ΤΟϒ
ΝΑϹωΡΟϒ ΑϒΤωΤϵ ΚΑΙ ϒΙΟΙϹ ΑϒΤΟϒ ΚΑΙ ϒΙωΝΟΙϹ
ϵΙϹ ΤΟ ΠΑΝ-ΤϵΛϵϹ ΑΙωΝΙΟΝ ΤϵΙΜΗΝ.

Fig. 64. Under this was the *unknown Character*, which I ſhall here give you a *Specimen* of, as well as it could be taken.

The Letters between theſe [ ] *Marks* were not legible, but I have ventured to ſupply the *Defect*, as alſo you will ſee in ſome others following. Neither was the ϵ in ΜΝΗΜϵΙΟΝ upon the *Stone*, but was doubtleſs omitted by Miſtake; and the *Inſcription* is nothing elſe but the *Inſcription* of a *Sepulchre*, the like to which we ſaw ſeveral. And as for the other *Character*, it being added almoſt under every *Greek Inſcription* we ſaw, and rarely found alone, I am apt to believe it the *Native Language* and *Character* of the Place, and the Matter it contains, nothing elſe but what we have in the *Greek*.

As ſoon as you are entered within the Court, you ſee the *Remainders* of two *Rows* of very noble *Marble Pillars*, 37 *Foot* high, with their *Capitals* of moſt exquiſite *carved* Work; as alſo muſt have been the *Cornices* between them, before by rude and ſuperſtitious Hands they were broken down. Of theſe there are now no more than 58 remaining intire; but there muſt have been a great many more, for they appear to have gone quite round the whole Court, and to have ſupported a moſt ſpacious double *Piazza* or *Cloiſter*. Of this *Piazza* the *Walks* on the Weſt-ſide, which is oppoſed to the *Front* of the *Temple*, ſeem to have exceeded the other in Beauty and Spaciousneſs; and at each End thereof are two *Niches* for *Statues* at their full Length, with their *Pedeſtals*, *Borders*, *Supporters*, and *Canopies*, *carved* with the greateſt Artifice and Curioſity. The Space within this once beautiful Incloſure, which is now filled with nothing but the dirty Huts of the Inhabitants, I conceive to have been an open Court, in the midſt whereof ſtands the *Temple*, encompaſſed with another *Row* of *Pillars* of a different *Order*, and much higher than the former, being above 50 *Foot* high. Of theſe remain now but 16. But there muſt have been about double that Number, which whether they incloſed an Inner Court, or ſupported the Roof of a *Cloiſter*, there being now nothing of a Roof remaining, is uncertain: Only one great Stone lies down, which ſeems to have reached from theſe *Pillars* to the *Walls* of the *Temple*. The whole Space contained within theſe *Pillars*, we found to be 59 *Yards* in Length, and in Breadth near 28. In the midſt of which Space is the *Temple*, extending in Length more than 33 *Yards*, and in Breadth 13 or 14. It points North and South, having a moſt magnificent *Entrance* on the Weſt, exactly in the middle of the Building; which, by the ſmall *Remains* yet to be ſeen, ſeems to have been one of the moſt glorious Structures in the World. I never ſaw *Vines* and *Cluſters* of *Grapes* cut in Stone ſo *bold*, ſo *lively*, and ſo *natural* in any Place. Juſt over the *Door* we could make a ſhift to diſcern part of the *Wings* of a large Spread-Eagle, extending the whole Wideneſs thereof: The Largeneſs whereof led me at firſt to imagine it might have been rather a *Cherub* over ſhadowing the *Entrance*, there being nothing of the Body remaining to guide one's Judgment; and ſome little *Angels* or *Cupids* appear ſtill in the Corners of the ſame Stone. But afterwards ſeeing other *Eagles* upon Stones that were fallen down, I conclude this muſt have been one likewiſe, only of a much larger Size. Of this *Temple* there is nothing at preſent but the outward Wall ſtanding, in which it is obſervable, that as the *Windows* were not large, ſo they were made narrower towards the Top than they were below, but all adorned with excellent *Carvings*. Within the Walls the *Turks*, or more probably *Mamalukes*, have built a *Roof*, which is ſupported by ſmall *Pillars* and *Arches*; but a great deal lower, as well as in all other reſpects diſproportionate and inferior to what the *antient Covering* muſt have been. And they have converted the Place into a *Moſque*, having added to the South-end thereof new Ornaments after their manner, with *Arabick Inſcriptions* and Sentences out of the *Alcoran*, wrote in Flouriſhes and Wreaths, not without Art: But at the North-end of the Building, which is ſhut out of the *Moſque*, are *Reliques* of much greater Artifice and Beauty. Whether they were in the nature of *Canopies* over ſome *Altars* placed there, or to what other Uſe they ſerved, I am not able to conjecture. They are beautified with the moſt curious *Fretwork* and *Carvings*; in the midſt of which is a *Dome* or *Cupola*, above 6 *Foot* Diameter, which we found above to be of one Piece; whether hewn out of a Rock intire, or made of ſome *artificial* Cement or Compoſition, by Time hardened into a *lapideous* Subſtance, ſeems doubtful; though I am rather inclined to believe the latter. It is, in fine, a moſt exquiſite Piece of Workmanſhip, and on which I could have beſtowed more Time to view it than what was allowed us.

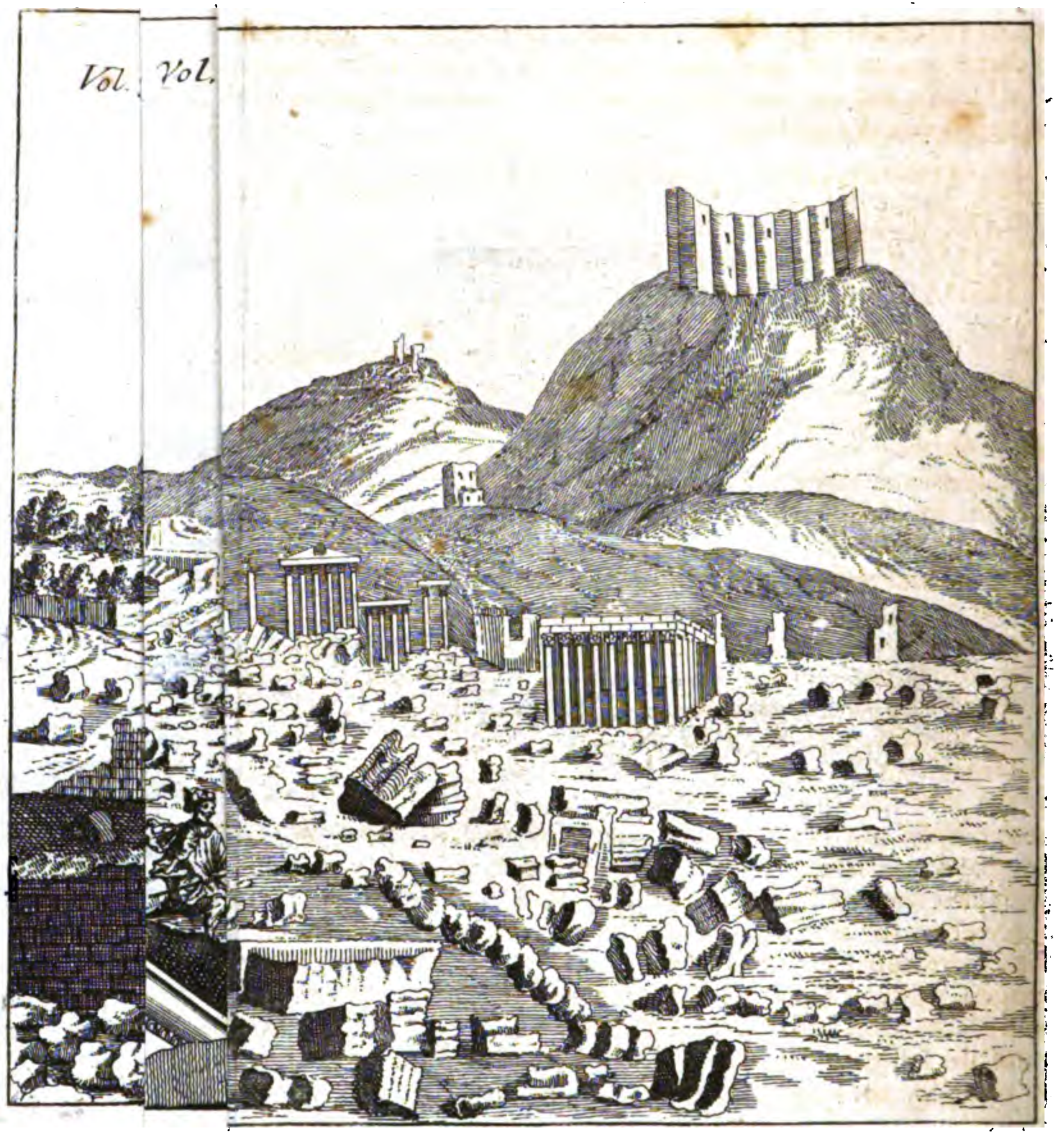
Having paſſed by the *Ruins* of a handſome *Moſque*, we had the Proſpect of ſuch *magnificent Ruins*, that if be lawful to frame a Conjecture of the original Beauty of that Place, by what is ſtill remaining, I queſtion ſomewhat whether any City in the World could have challenged Precedence of this in its Glory.

Advancing towards the North, you have before you a very tall and ſtately *Obeliſk*, or *Pillar*, conſiſting of 7 large Stones, beſides its *Capital* and the wreathed Work about it; the *Carvings* here, as in all other Places, being extraordinary fine. The Height of it is above 50 *Foot*, and upon it I conceive may have ſtood a *Statue*, which the *Turks*, zealous Enemies of all *Imagery*, have thrown down and broken in pieces. It is in Compaſs, juſt above the *Pedeſtal*, 12 *Foot* and a *half*. On each Hand of this, towards the Eaſt and Weſt, you ſee two other large *Pillars*, each a Quarter of a Mile diſtant from you, which ſeem to have ſome Correſpondence one to the other. And there is a Piece of another, ſtanding near that of the Eaſt, which would incline one to think there was once a continued *Row* of them. The Height of this to the Eaſt I took with my *Quadrant*, and conclude to be more than 42 *Foot* high, and the Circumference proportionable. Upon the Body thereof is the following *Inſcription*;

Η ΒΟΥΛΗ ΚΑΙ Ο ΔΗΜΟϹ ΑΛΙΛΑΜЄΝΑ ΠΑΝΟΥ ΜΟΚΙΜΟΥ
ΤΟΥ ΑΙΡΑΝΟΥ ΤΟΥ ΜΑΘΘΑ ΑΙΡΑΝΗΝ ΤΟΝ ΠΑΤЄΡΑ
ΑΥΤΟΥЄΥϹЄΒЄΙϹ ΚΑΙ ΦΙΛΟΠΑΤΡΙΔΑϹΚ[ΑΙ]ΠΑΝΤΙ ΤΡΟΠω
[ЄΥ] ϹЄΙΜωϹ ΑΡЄϹΑΝΤΑϹ ΤΗ ΠΑΤΡΙΔΙ ΚΑΙ ΠΑΤΡΙΟΙϹ
ΘЄΟΙϹ ΤЄΙΜΗϹ ΧΑΡΙΝ ЄΤΟΥϹ ΝΥΑ ΜΗΝΟ ΞΑΝΔΙϹΟΥ.

It ſeems evident by this and ſome following *Inſcriptions*, that they were a *Free State*, governed by a *Senate* and *People*, though perhaps under the Protection of greater *Empires*; the *Parthians*, it is probable, firſt, and afterwards the *Romans*, who for a long time contended for the Maſtery here in the Eaſt. And this Government might continue among them till about the Time of *Aurelian*, who demoliſhed the Place, and led *Zenobia*, Wife of *Odenatus*, Captive to *Rome*; who, though ſhe be called *Queen*, yet I find not that ever her Husband had the Title of *King*, but was only one of the chief Inhabitants, a leading Man in the *Senate* (as it is probable theſe *Alilamanes* and *Airanes* were before him) who while the *Romans* were buſied in *Europe*, made himſelf great here, and by his own Force repelled the *Parthians*; who having maſtered whatever was held by the *Romans* on the other ſide of *Euphrates*, made an Incurſion into *Syria*, but were by *Odenatus* driven back beyond the River. In the Courſe of theſe Wars *Odenatus* was ſlain; but his Wife *Zenobia*, being a Woman of a Maſculine Spirit, not only kept her Ground againſt her Enemies abroad, but maintained her Authority at home, keeping the Government in her Hands. Afterwards, out of a Deſire to caſt off the *Roman* Yoke, ſhe cauſed the whole Gariſon, which was left there by *Aurelian*, to be barbarouſly cut off. Which bringing *Aurelian* back with his Army, he quickly took the City and deſtroyed it, putting the Inhabitants to the Sword, and carrying *Zenobia* Captive to *Rome*; which was the fatal Period of the Glory of that Place. This Cuſtom of theirs of running up their *Genealogies* or *Pedigrees* to the 4th or 5th Generation, ſhews them to have borrowed ſome of their Faſhions from their Neighbours the *Jews*, with whom it is not unlikely they had of old great Commerce; and perhaps many of them were deſcended from that People, *Zenobia* herſelf being ſaid to have been a *Jeweſs*; or elſe this muſt have been the Manner of all the *Eaſtern* Nations. Their *Æra*, or Account of Time, they begin from the *Death* of *Alexander the Great*, as the *Syrians* generally do; the very *Chriſtians* at this Day following the ſame Uſage. Yet though they mark the Date of the *Year* by *Greek Letters*, you may obſerve they place them a different way from the *Greeks*, ſetting the leſſer Number firſt, as if they were to be read backward from the Right-hand to the Left; ΝΥ here, denoting 450. The third Letter Λ, I take to ſtand for the *Day* of the *Month*, *viz.* the laſt of *Xandicus*, which is with us *April*; this and other Names of *Months*, which are found in other *Inſcriptions*, being borrowed from the *Macedonians* with very little Variation. That they were *Idolaters* is plain by the mention of their Country Gods, both here and in other Places; ſo that their Commerce with the *Jews* did not, it ſeems,

bring



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bring them to the Knowledge of the true God; or elſe they muſt have degenerated therefrom, and relapſed into *Idolatry.* The other *Pillar* towards the Weſt in Height and Circumference anſwers this, and has upon the Side the following *Inſcription* engraved.

Η ΒΟΥΛΗ ΚΑΙ Ο ΔΗΜΟϹ ΒΑΡεΙΧεΙΝ ΑΜΡΙϹΑΜϹΟΥ ΤΟΥ
ΙΑΡΙΒωΛεΟΥϹ ΚΑΙ ΜΟΚΙΜΟΝ
ΥΙΟΝ ΑΥΤΟΥ εΥϹεΒεΙϹ ΚΑΙ
ΦΙΛΟΠΑΤΡΙDΑϹ ΤεΙΜΗϹ ΧΑΡΙΝ . . . .

The Date of this is not legible, neither does one know what Judgment to make of the thing itſelf. That ſuch a *Pillar* ſhould be erected only to ſupport the *Inſcription*, and convey theſe Mens Names to After-ages, without particularizing what they did to deſerve that Honour, is ſomething ſtrange; unleſs we may ſuppoſe it was a prevailing *Vanity* in theſe *Eaſtern* Countries, thus to endeavour to eternize their Fame; an Inſtance whereof we have in *Scripture*, in *Abſalom*'s ſetting up a *Pillar*, and perhaps before 2 *Kings*
him, in *Saul.* Otherwiſe it may appear no improbable Conjecture, that xviii. 18.
the *Pillar* was erected long before upon ſome other Occaſion, and after- 1 *Sam.* xv.
wards made uſe of to this End: And I look upon it as paſt all Doubt, that 12.
ſeveral other *Inſcriptions* which we ſaw, were much more modern than the *Pillars* on which they were engraved.

Proceeding forward, directly from the *Obeliſk*, about 100 *Paces*, you come to a magnificent *Entrance*, vaſtly large and lofty, and for the Exquiſiteneſs of the Workmanſhip not inferior to any thing before deſcribed. This *Entrance* leads you into a noble *Piazza* of more than *half* a *Mile* long (930 *Yards* according to our meaſuring) and 40 *Foot* in Breadth, incloſed with two *Rows* of ſtately *Marble Pillars*, 26 *Foot* high, and 8 or 9 about. Of theſe remain ſtanding and intire 129; but by a moderate Calculation, there could not have been leſs than 560. *Covering* there is none remaining, nor any *Pavement* at the Bottom, unleſs it be buried under the Rubbiſh: But upon almoſt all the *Pillars* we found *Inſcriptions*, both in *Greek* and the Language *unknown*, of which we had but Time to take theſe few, and thoſe not very inſtructive.

ΙΟΥΛΙΟΝ ΑΥΡΗΛΙΟΝ ΖεΒεΙΔΑΝ ΜΟΚΙΜΟΥ ΤΟΥ
ΖεΒεΙΔΟΥ . . . . ΑϹΘωΡΟΒΑΙΔΑΟΙ ϹΥΝ
Α[Υ] Τω ΚΑΤεΛΘΟΝΤεϹ εΙϹ ΟΛΟΓεϹΙΑΔΑ εΝΠ
ΘΡΟΙΑΝ εϹΤΗϹΑΝ ΑΡεϹΑΝΤΑ ΑΥΤΟΙϹ ΤεΙΜΗϹ
ΧΑΡΙΝ ΞΑΝΔΙΚω ΤΟΥ ΗΝΦ εΤΟΥϹ . . . .

This laſt *Inſcription* ſeems to have been put in Memory of an *Embaſſy*, performed by thoſe Men that are named therein, for ſettling a Commerce and Traffick, which was to their Satisfaction accompliſhed. But with whom, till I can find out what Place is meant by ΟΛΟΓεϹΙΑΔΑ, I muſt remain ignorant. I am unwilling to entertain any Thoughts of *Getia* in

Macedonia, or of *Olgaſſus*, a Place mentioned by *Strabo* in *Bithynia*, which comes a little nearer the Name; being both ſo remote, and the City of *Tadmor* ſo ill contrived for a Place of Trade, being far from the Sea, and without the Advantage of any River: Yet the *Magnificence* of the Place ſhews they have not wanted Riches among them: And their *Salt* is a Commodity which ſtill brings them in a conſiderable Advantage. The Order of the *Numeral Letters* you may take notice is again inverted; but taking them the right Way, the Year 558 falls in with the laſt Year of *Alexander Severus*, which is of *our Lord* 234.

About the Middle of the *Piazza*, upon another *Pillar*, was this following *Inſcription*:

Η ΒΟϒΛΗ ΚΑΙ Ο ΔΗΜΟC ΙΟϒΛΙΟΝ ΑϒΡΗΛΙΟΝ ΖΗΝΟ-
ΒΙΟΝ ΤΟΝ ΚΑΙ ΖΑΒΔΙΛΑΝ ΔΙCΜΑΛΧΟΥ ΤΟϒ ΝΑCCΟϒ-
ΜΟϒ CΤΡΑΤΗΓΗCΑΝΤΑ єΝ єΠΙΔΗΜΙΑ ΘєΟϒ ΑΛєΞΑΝ-
ΔΡΟϒ ΚΑΙ ϒΠΗΡєΤΗCΑΝΤΑ ΠΑΡΟϒCΙΑ ΔΙΗΝєΚєΙ ΡΟϒ-
ΤΙΛΛΙΟϒ ΚΡΙCΠєΙΝΟϒ ΤΟϒ ΗΓΗCΑΜΝєΟϒ ΚΑΙ єΠΙΔ[illegible]
ΜΗCΑCΑΙC ΟϒΗΞΙΛΛΑΤΙΟCΙΝ ΑΓΟΡΑΝΟΜΗCΑΝΤΑ Τ[illegible]
ΚΑΙ ΟϒΚΟΝΙCωΝΑ ΦєΙΔΗCΑΝΤΑ ΧΡΗΜΑΤωΝ ΚΑΙ ΚΑΛ[illegible]
ΠΟΛΕΙΤєϒCΑΜєΝΟΝ ωC ΔΙΑ ΤΑϒΤΑ ΜΑΡΤϒΡΗΘєΝΤ[illegible]
ϒΠΟ ΘєΟϒ ΙΑΡΙΒωΛΟϒ ΚΑΙ ϒΠΟ ΙΟϒΛΙΟϒ . . . . ΤΟϒ
єΞΟΧωΤΑΤΟϒ єΠΑΡΧΟϒ ΤΟϒ ΙєΡΟϒ ΠΡΑΙΤωΡΙΟϒ ΚΑΙ
ΤΗC ΠΑΤΡΙΔΟC ΤΟΝ ΦΙΛΟΠΑΤΡΙΝ ΤєΙΜΗC ΧΑΡΙΝ єΤΟϒC
ΔΝΦ.

This is as perfect an *Inſcription* as any I met with, by the Help of which we may make a Judgment of all the reſt; at leaſt thus far, that they were put up in Memory of ſome who had behaved themſelves in thoſe publick Offices they bore, either in their own Republick, or under the *Roman*, with Commendation: This being a publick Place, where their Names and worthy Actions were recorded and tranſmitted to Poſterity. What I further obſerved particularly in this, was the want of the Name of ΙΟϒΛΙΟϒ, and took notice of the like Space vacant in the other *Language* under it; and in both Places it ſeemed to be not worn out with Time, but voluntarily ſcratched out: Which confirms me in the Opinion that they are both one, and that the *unknown* was the *vulgar*, as the *Greek* was the *learned Language* of the Place.

Upon another *Pillar* in the ſame Walk was this:

CєΠΤΙΜΙΟΝ ΟϒΟΡωΔΗΝ ΤΟΝ ΚΡΑΤΙCΤΟΝ єΠΙΤΡΟΠΟΝ
CєΒΑCΤΟϒ ΔΟϒΚΗΝΑΡΙΟΝ ΚΑΙ ΑΡΟΠєΤΗΝ ΙΟϒΛΙΟC
ΑϒΡΗΛΙΟC єΑΛΜΗC ΚΑCCΙΑΝΟϒ ΤΟϒ Μ[є]ΛєΝΑΙΟϒ
ΙΠΠєϒC ΡωΜΑΙωΝ ΤΟΝ ΦΙΛΟΝ ΚΑΙ ΠΡΟCΤΑΤΗΝ єΤΟϒC
Η Ο Φ . . ΜΗΝєΙ [Ξ] ΑΝΔΙΚω.

From another *Pillar* in the ſame *Piazza* was tranſcribed this broken *Inſcription* which follows; which I have endeavoured to make up from the former, believing them in Subſtance the very ſame, with little Alteration of Names.

ϹεΠΤΙΜ[ΙΟΝ ΟΥΟΡωΔΗΝ] ΤΟΝ ΚΡΑ[ΤΙϹΤΟΝ εΠΙΤΡΟ]ΠΟΝ ϹεΒΑϹ[ΤΟΥ ΔΟΥΚ]ΗΝΑΡΙΟΝ ΚΑ[ΙΑΡΟΑΠε]ΤΗΝ ΙΟΥΛΙΟϹ ΑΥ[ΡΗΛΙ]ΟϹ ε[ΑΛΜΗϹ]ΠΥΙΛϹΟϹ Μ[εΛεΝΑΙ]ΟϹ ΜΑΛωΧΑΝΑϹϹΟΥΜΟ[Υ]ΟΚΡΑΤΙϹΤΟϹΤΟΝ [ΦΙΛΟΝ] ΚΑΙ ΠΡΟϹΤΑΤΗΝ ΤεΙΜΗϹ εΝεΚεΝ εΤΟΥϹ..... [ΜΗΝεΙΞ] ΑΝΔΙΚω.

What we may collect from both theſe *Inſcriptions*, and divers others of a like Import, is, that as the *State*, the *Senate*, and *People* did ſometimes honour thoſe that had been in publick Truſt with *Inſcriptions* on theſe *Pillars*; ſo when this was not done by them, *private* Perſons had the Liberty to do the ſame for their *Friends*. And I ſhall give you an Inſtance, by-and-by, of one engraven by a *Husband* in Memory of his *Wife*.

Upon ſeveral of theſe *Pillars* are little *Pedeſtals* jetting out about the Middle of them, ſometimes one Way only, and ſometimes more, which ſeem to have been the *Baſes* or Standing-Places of *Statues*. On theſe *Pedeſtals* we ſaw many *Inſcriptions*, ſometimes when there was none upon the Body of the *Pillar*, and ſometimes when there were. As for Inſtance, this that follows upon the *Pedeſtal*, thus;

ϹεΠΤΙΜΙΟΝ ΑΙΡΑΝΗΝ ΟΔΑΙΝΟΘΟΥ ΤΟΝ ΛΑΜΠΡΟΤΑΤΟΝ ϹΥΝΚΛΗΤΙΚΟΝ.

And upon the *Body* of the *Pillar* this imperfect one;

εΞΑ......ΝΤωΝ ΑΥΡΗΛΙ......ΡΗΛΙΟΔωΡ.....ϹΤΡΑΤΙωΤΗϹ Λε.......ΚΗϹ ΤωΝ ΠΑΤΡωΝ ΤεΙΜΗϹ ΚΑΙ εΥΧΑΡΙϹΤΙΑϹ ΧΑΡΙΝ εΤΟΥϹ ΤΞΦ.

We ſee they eſteemed it very honourable to have their Memories preſerved after this Manner; but it is but little Knowledge of them we can get from hence, ſave now-and-then the *Time* when they lived. As here, 563 *Years* after the *Death* of *Alexander*, reach to the *Year* of *our Lord* 239.

Another *Inſcription* in the ſame *Piazza* was thus;

ΗΒΟΥΛ[ΗΚΑΙ ΟΔΗ]ΜΟϹ ϹεΠΤΙΜΙΟΝ ΤΟΝ ΚΡΑΤΙϹΤΟΝ ε[ΠΙΤΡΟΠΟΝ Ϲ]εΒΑϹΤΟΥ ΔΟΥΚΗΝ[ΑΡΙΟΝ]...εΟΔΟΤΗΝ ΤΗϹ ΜΗΤ[ΡΟΚΟΛω]ΝεΙΑϹ ΚΑΙ ΑΝΑϹΟΜΙϹΑ[ΝΤΑ Τ] ΑϹ ϹΥΝΟΔΙΑϹ εΞ ΙΔΙωΝ ΚΑΙ ΜΑΡΤΥΡΗΘεΝΤΑ ΥΠΟ ΤωΝ ΑΡΧεΜΠΟΡωΝ ΚΑΙ ΛΑΜΠΡωϹ ϹΤΡΑΤΗΓΗϹΑΝΤΑ ΚΑΙΑΓΟΡΑΝΟΜΗϹΑΝΤΑ ΤΗϹ ΑΥΤΗϹ ΜΗΤΡΟΚΟΛωΝεΙΑϹ ΚΑΙ ΠΛεΙϹΤΑ ΟΙΚΟΘεΝ ΑΝΑΛωϹΑΝΤΑ ΚΑΙ ΑΡεϹΑΝΤΑ ΤΗ Τε ΑΥΤΗ ΒΟΥΛΗ ΚΑΙ Τω ΔΗΜω ΚΑΙ ΝΥΝεΙ ΛΑΜΠΡωϹ ϹΥΜΠΟϹΙΑΡΚΟΝ ΤωΝ ΤΟΥ ΔΙΟϹ ΒΗΛΟΥ Ιε[Ρ]ωΝ ΤεΙΜΗϹ εΝ εΚ εΝ εΤ........ ΞΑΝΔΙΚω.

This affords a ſufficient Confirmation of what I before obſerved, that theſe were honorary *Inſcriptions* in Memory of thoſe that had behaved themſelves well in *publick Offices*; of which we have ſeveral mentioned here, whereof ſome are very well known, but the others not eaſy to be met with in *Books*. By the Word ΜΗΤΡΟΚΟΛωΝЄΙΑϹ we may be aſſured, that though this City was reduced by the *Romans* into the Form of a *Colony*, yet it had a peculiar Mark of *Honour* ſet upon it, to ſignify that it was the Chief of their *Colonies* in theſe *Oriental* Parts; that the Authority alſo of their *Senate* and *People* was continued to them; and beſides, that there was a *Society* of Men, either *Curators* of the *Temple* of *Jupiter Belus* (to whom the *Temple* before deſcribed perhaps was dedicated) or Overſeers of the Sports and Feſtivals that were celebrated in Honour of him, of which Sodality this *Septimius* was, when this *Inſcription* was made, a *Sympoſiarch*, perhaps their *Chief* and *Governor*. By this too we find they did not wait for the *Deaths* of thoſe they thus *honoured*, before they provided for the Preſervation of their *Memories*; but famous Men were thus *regiſtred* for After-ages even while they were alive.

Upon one of theſe *Pedeſtals* before deſcribed, not far from the former, was the following *Inſcription*; which I valued the more for the little Remainder it has preſerved of the Name of *Palmyra*, by which the Place was known to the *Romans*.

..... ΥΠΙΛΙΟΝ ΟΥΟΡωΔΗΝ [ϹΥΝΚΛ] ΗΤΙΚΟΝ ΚΑΙ
ΒΟΥΛ ΥΤΗΝ ΠΑΛΜΥΡΗΜΟΝΒΗΛΑ ΚΑΒΟϹΑΡϹΑ
ΤΟΝ ΦΙ[ΛΟΝ] ΤєΙΜΗϹ ΧΑΡΙΝ ЄΤΟΥϹ ΟΦ.

The Upper-end of this *ſpacious Piazza* was ſhut in by a *Row of Pillars*, ſtanding ſomewhat cloſer than thoſe on each Side; and perhaps there might have been a kind of *Banquetting-Houſe* above, but now no certain Footſteps thereof remain. But a little farther to the Left-hand, and, it may be, continued with the former *Walk*, lie the *Ruins* of a very ſtately Building, which I am apt to believe might have been for ſuch an Uſe. It is built of a better *Marble*, and has an *Air* of *Delicacy* and *Exquiſiteneſs* in the *Work* beyond what is diſcernible in the *Piazza*. The *Pillars* which ſupported it are of *one intire Stone*; and on one of them that is fallen down, but ſo firm and ſtrong that it has received no Injury thereby, we meaſured and found 22 *Foot* in Length, and in Compaſs 8 *Foot* and 9 *Inches*. Among theſe *Ruins* we found the only *Latin Inſcription* we ſaw in the Place, and that ſo imperfect, there is but little of it intelligible.

.... *es Orbis & Propagatores Generis Humani DD. NN.*
Diocletianus .... *ſſimi Impp. Et Conſtantius & Maximianus*
Nobb. Cæſ. Caſtra feliciter condiderunt.

And upon the ſame *Stone*, a little lower,

........*ntes Oſſiano Hierocleti, V. P. Præf. Provinciæ D. N. M. O. Eorum.*

The Name of *Maximianus Herculeus*, who was Partner in the Empire with *Diocleſian*, which ſhould have followed in the Inſcription, ſeems to have been on Purpoſe ſcratched out and defaced; for what Reaſon I cannot gueſs. The reſt is loſt by the breaking of the Stone.

In the Weſt Side of the great Piazza are ſeveral Openings for Gates, leading into the Court of the Palace: Two whereof, one would eaſily believe, when they were in their Perfection, were the moſt magnificent and glorious in the World, both for the Elegancy of the Work in general, and particularly for thoſe ſtately Porphyry Pillars with which they were adorned. Each Gate had 4, not ſtanding in a Line with the others of the Wall, but placed by Couples in the Front of the Gate, facing the Palace; two on one Hand, and two on the other: Of theſe remain but two intire, and but one ſtanding in its Place. They are about 30 Foot in Length, and 9 in Circumference: Of a Subſtance ſo exceeding hard, that it was with great Difficulty we broke off a few Shivers to bring home with us for a Pattern of the Stone; the Art of making which, I think, is quite loſt. We ſaw ſeveral other broken Pieces of Porphyry, but neither of ſo accurate a Mixture and Compoſition, nor ſo large as the former.

The Palace itſelf is ſo intirely ruined, that no Judgment can be made what it was in its antient Splendor, either for the Figure or Workmanſhip thereof. There is only here and there a broken Piece of a Wall remaining beat into Pieces by Violence, and conſumed by Time to that Degree, that without the Help of Tradition we could hardly be well aſſured that a *Royal Palace* did once fill that Space. We may gueſs, however, that it fronted the famous Piazza before-mentioned, and was ſurrounded with Rows of Pillars of different Orders; many of which are ſtill ſtanding, ſome plain, and ſome wrought and chanell'd, as thoſe immediately encompaſſing the *Temple*. And upon thoſe little Pedeſtals which ſtood out of the Middle of ſome of them, I obſerved ſeveral *Inſcriptions*, but could not conveniently take more than one, which, together with the Pillar that ſupported it, was fallen to the Ground. It was this;

ΜΑΡΘЄΙΝ ΑΛЄΞΑΝΔΡΟϒ ΤΟϒ ΚΑΠΑΔΗ ΤΟϒ ΟϒΑ-
ΒΑΛΛΑΘΟϒ ΤΟϒ ϹϒΜωΝΟϒ ϹΟΡΑΙΧΟϹ ΑΙΡΑΝΟϒ
ΑΝΗΡ ΑϒΤΗϹ ΜΝΗΜΗϹ ЄΝЄΚЄΝ ΜΗΝЄΙ ΔϒϹΤΡω
ΤΟϒ ϟ ϒ ЄΤΟϒϹ.

If the reſt were of a like Nature with this, we have loſt no great Matter by not taking them, this being only a *Memorial* which a kind Husband cauſed to be ſet up in Honour of his Wife; the Month *Dyſtrus* anſwers to our *March*, and the Year 490, from the Death of *Alexander the Great*, the Year of our Lord 166.

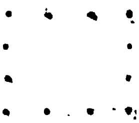
I omitted to mention before, that under the *Long Walk* runs a Current of hot ſulphureous Waters; and there is a Well and other Paſſages down to them: But whatever they may have been of old, they are not now ſo convenient as another about half a Mile Weſtward from hence; where there is a very good Deſcent into the Water, and it is ſtill uſed by the People to bathe in. Near to which, upon the Pedeſtal of a broken Pillar (or perhaps it might be an Altar) remains this following *Inſcription*:

ΔΙΙ ΥΨΙϹΤω ΜєΓΙϹΤω ΚΑΙ єΠΗΚΟω ΒωΛΑΝΟϹ ΖΗΝΟ-
ΒΙΟΥ ΤΟΥ ΑΙΡΑΝΟΥ ΤΟΥ ΜΟΚΙΜΟΥ ΤΟΥ ΜΑΘΘΑ єΠΙ
ΜєΛєΤΗ ϹΟΗ ΑΙΡєΘєΙϹ єΦΚΑϹ ΠΗΓΗϹ ΥΠΟ ΙΑΡΙΒω-
ΛΟΥ ΘєΟΥ ΤΟΝ Βω[ΜΟΝ] єΞ ΙΔΙωΝ ΑΝєΘΗΧєΝ
єΤΟΥϹ Δ Ο Υ ΜΗΝΟϹ ΥΠєΡΒєΡєΤΑΙΟΥ Κ.

I am pretty confident that the Word I have marked with a Line under it, is rightly taken, and therefore know not what to gueſs it to be, unleſs the proper Name of the Fountain. And upon that Suppoſition the *Inſcription* is eaſily intelligible, ſhewing that *Bolanus*, Son of *Zenobius*, &c. being elected Overſeer or Curator of this Fountain under *Jaribolus*, built this Altar to *Jupiter* in the Year of *Alexander*, 474. *i. e.* of our Lord 150, and on the 20th of *October*, if the laſt *Kappa* be a Numeral, as I ſuppoſe it muſt. But who this *Jaribolus* was, on whom they beſtow, as generally upon the *Roman* Emperors, whoſe Names occur in the *Inſcriptions*, the Title of ΘєΟϹ, is not ſo facile a Conjecture. They were under the *Parthians*, before the *Romans* fell in among them; but the Date ſhews this to be after the Time of *Hadrian*, and ſo after their coming. Nay, and in an *Inſcription* before-mentioned, which is of a later Date than this by 80 Years, we have the Name of the ſame Perſon.

Hot ſulphureous Baths are Things very frequent in this Country; and hence it is that it obtained the Name of *Syria Salutifera*. The Scent of the Waters here is much like thoſe of *Bath* in *England*, but not ſo ſtrong, neither is the Taſte ſo offenſive: On the contrary, when they have run ſo far from the Fountain, as to become cold, they are very potable, and are the only Water the Inhabitants uſe.

On the Eaſt-ſide likewiſe of the long Piazza ſtands, if I may uſe ſuch an Expreſſion, a Wood of Marble Pillars, ſome perfect, and others deprived of their beautiful Capitals; but ſo ſcattered and confuſed, that it is not poſſible to reduce them into any Order, ſo as to conjecture to what they antiently ſerved. In one Place are 11 together in a Square after this manner, paved at the Bottom with broad flat Stone, but without any Roof or Covering. And at a little Diſtance from that ſtand the Ruins of a ſmall Temple, which, by the Remains, ſeems to have been for the Workmanſhip very curious. But the Roof is wholly gone, and the Walls very much defaced and conſumed with Time. Before the Entrance, which looks to the South, is a



Piazza ſupported by 6 Pillars, two on one hand of the Door, and two on the other, and at each End one. And the Pedeſtals of thoſe in the Front have been filled with *Inſcriptions*, both in *Greek* and the other Language; but they are now ſo obliterated and worn out, as not to be intelligible. The moſt perfect was this that follows:

. ΜΑΛεΝΤΟΝ ΚΑΙΑΓΡΙΠΠΑΝ ΙΑΡΑΙΟΥ ΤΟΥ ΡΑΑΙΟΥ ΓΡΑΜΜΑΤεΑ ΓεΝΟΜεΝΟΝ ΤΟ ΔεΥΤεΡΟΝ εΠΙΔΗΜΙ[Α] ΘεΟΥ ΑΔΡΙΑΝΟΥ ΑΛΙΜΜΑ ΠΑΡΑCΧΟΤΑ ΞεΝΟΙC Τε ΚΑΙ ΠΟΛεΙΤΑ[IC]...... And a little below were theſe ſtraggling Letters viſible.

εΝΗ....ΝΥΠΗΡεΤΗCΑΝΤΑ ΤΗΤ....CΤΡΑΤΕΥΜΑ ΤΟΤ ...ΥΠΟ....ΗΚΑΙ......ΤΟΝ ΝΑΟΝ ΤΟΝ....ΔΙΟC...., ΝΤωΤ........

I ſhould have imagined ΚΑΙ to have been a Copulative, and the ſecond Name, *Agrippa*, diſtinct from the former; but that the Words following in the Singular Number, will not admit of ſuch a Conſtruction. The Perſon then, in Memory of whom this *Inſcription* was made, muſt have been named *Malentus Caeagrippa*, who bearing ſuch an Office as *Scribe*, or the like, in the Expedition of *Adrian* the Emperor, performed an Act of publick Beneficence and Generoſity, both to Strangers and Citizens, denoted by the Word ΑΛΙΜΜΑ, or ἄλειμμα, which ſignifies *Unction*. Perhaps he diſtributed amongſt them ſweet Oils, to be uſed in or after their Bathings. It is pity what follows is ſo imperfect, and eſpecially that we cannot find out the Date; for that might have directed us to the preciſe Time of *Hadrian's* Expedition into theſe *Oriental* Parts, where he made great Conqueſts, and enlarged the Bounds of the *Roman* Empire.

But as great a Curioſity as any were their Sepulchres, being ſquare Towers 4 or 5 Stories high, and ſtanding on both Sides of a hollow Way, towards the North Part of the City. They ſtretch out in Length the Space of a Mile, and perhaps formerly might extend a great Way further. They were all of the ſame Form, but of different Splendor and Greatneſs, according to the Circumſtance of their Founders. The firſt we viewed was intirely Marble, but is now wholly in Ruins, and nothing but a Heap of broken Stones; amongſt which we found the Pieces of two Statues, one of a Man, and another of a Woman, cut in a ſitting, or rather leaning Poſture; the Heads and Part of the Arms of both being broken off, but their Bodies remaining pretty intire; ſo that we had the Advantage of ſeeing their Habits, which appeared very noble, but more reſembling the *European* Faſhion than what is now in the *Eaſt*; which inclined me to think they might be *Romans*. Upon broken Pieces of Stone tumbled here and there, we found ſome broken *Inſcriptions*; but, not affording any perfect Senſe, they are not worth the tranſcribing.

Many other Sepulchres there were as much gone to Decay as this, which therefore we paſſed by, to go to two which ſtood almoſt oppoſite to one another, and ſeemed moſt perfect of any, though not without Marks of the *Turkiſh* Malice. They are two ſquare Towers, rather larger than ordinary Steeples, and 5 Stories high, the Outſide being of common Stone; but the Partitions and Floors within of good Marble, and beautified too with very lively Carvings, and Paintings, and Figures, both of Men and Women, as far as the Breaſt and Shoulders; but miſerably defaced and broken. Under theſe Statues, or by their Sides, are, in the unknown Character, the Names probably of the Perſons there buried, or by them repreſented; or elſe ſome other Memorials of them. We entered one of theſe by a Door on the South Side, from which was a Walk croſs the whole Building juſt in the Middle. But the Floor was broke up, and ſo gave us a Sight of the Vault below, divided after the ſame Manner. The Spaces on each Hand were again ſubdivided into 6 Partitions by thick Walls, each Partition being capable of receiving the largeſt Corps; and piling them one above another, as their Way appears to have been, each of thoſe Spaces might contain at leaſt 6 or 7 Bodies. For the loweſt, ſecond, and third Stories, thoſe Partitions were uniform, and altogether the ſame, ſave from the ſecond Floor, which anſwered the main Entrance, one Partition was reſerved for a Stair-caſe. Higher than this, the Building being ſomething contracted towards the Top, it would not afford Space for the Continuation of the ſame Method; therefore the two uppermoſt Rooms were not ſo parted, nor perhaps ever had any Bodies laid in them, unleſs it was that of the Founder alone, whoſe Statue, wrapped up in funeral Apparel, and in a lying Poſture, is placed in a *Nich*, or rather Window, in the Front of the Monument, ſo as to be viſible both within and without. Near to this Statue was the following *Inſcription:*

ΤΟ ΜΝΗΜϵΙΟΝ ϵΚΤΙϹΑΝ ϵΛΑΒΗΛϵϹΜΑΝΝΑΙΟϹ ϹΟΧΑϵΙϹ ΜΑΛΧΟϹ.ΟϒΑΒΑΛΛΑΘΟϒ ΤΟϒ ΜΑΝΝΑΙΟϒ ΤΟϒ ϵΛΑΒΗΛΟϒ ΑϒΤώ ΚΑΙ ϒΙΟΙϹ ϵΤΟϒϹ ΔΙϒ ΜΗΝΟϹ ΞΑΝΔΙΚΟϒ.

It is a little doubtful, whether ΑϒΤω ſhould not rather be made ΑϒΤΟΙϹ, or elſe there muſt be a Fault in the Verb, and all thoſe but the Names of one Perſon.

The other Monument on the other Side of the Way is very much like this; only the Front and Entrance are towards the North, and is not altogether ſo polite, nor ſo well painted; but the Carvings are as good, and it ſhews altogether as ſtately and magnificent as the former. Beſides, it has the Advantage in Age of a whole Century of Years; as appears from the Date of the following *Inſcription.* It is placed above a *Nich* in the Front, adorned with handſome Borders and Cornices; the Place doubtleſs of ſome Statue, and probably that of the Founder:

ΜΝΗΜϵΙΟΝ ΑΙωΝΙΟΝ ΓϵΡΑϹ ωΚΟΔΟΜΗϹϵΝ ΓΙΧΟϹ ΜΟΚΙΜΟϒ ΤΟϒ ΚΑΙΑΚΙΑΛϹΙϹΟϒ ΤΟϒ ΜΑ......Οϒ ϵΙϹΤϵ ϵΑϒΤΟΝ ΚΑΙ ϒΙΟϒϹ ΚΑΙ ϵΓΓΟΝΟϒϹ ϵΤΟϒϹ ΔΙΤ ΜΗΝϵΙ ΞΑΝΔΙΚω.

This is the moſt antient *Inſcription* I met with in *Tadmor*, the 314th Year from the *Death* of *Alexander the Great*, preceding the *Birth* of our *Saviour* about 10 *Years*. The other alſo is between 20 or 30 *Years* before the Reign of *Hadrian*, and conſequently before the *Romans* got Footing here. And from theſe ſumptuous Structures, and theſe coſtly *Mauſolea*, we may reaſonably conclude, they were a potent and opulent People before they became ſubject to the *Romans*, and were not obliged to them for their *Greatneſs*.

After 4 *Days* Stay we returned, not the Way that we came, but proceeding Eaſtward towards the River *Euphrates*. In our Way to which, the 3d *Day*, paſſing through a Village called *Tieve*, upon a Stone ſet wrong End upwards, in the Midſt of the *Wall* of the *Moſque*, we met with the following *Inſcription*:

ΔΙΙ ΜƐΓΙϹΤω ΚƐΡΑΥΝΙω ΥΠƐΡ ϹωΤΗΡΙΑϹΤΡΑ: ΑΔΡΙΑ-
ΝΟΥ ϹƐΒ .... ΤΟΥ ΚΥΡΙΟΥ ΑΓΑΘΑΝΓƐΛΟϹ ΑΒΙΛΗΝΟϹ
ΤΗϹ ΔƐΚΑΠΟΛƐΟϹ ΤΗΝ ΚΑΜΑΡΑΝ ωΚΟΔΟΜΗϹƐΝ ΚΑΙ
ΤΗΝ ΚΛΙΝΗ .... ƐΞ ΙΔΙωΝ ΑΝƐΘΗΚƐΝ ƐΤΟΥϹ ƐΜΥ
ΜΗΝΟϹ ΛωΟΥ.

And under this was another in the ſame *Language* and *Character* we had ſeen at *Tadmor*. I was ſurpriſed to find ſuch an *Inſcription* in this Place, nor can any way gueſs how they ſhould come by it; and the Mention of *Decapolis* makes me ſtill more in the Dark. If one might extend the Bounds of *Decapolis*, as ſome are ſaid to have done, as far as *Cælo-Syria*, and compriſe under this Name again all *Syria*, *Phœnicia* only excepted, then need it not be brought from elſewhere, but firſt ſet up in this Village. But this will not be allowed by thoſe who make *Decapolis* only a Part of *Paleſtine*. The Matter of Fact it contains, is only an Account of the Magnificence of this *Agathangelus Abilenus*, whoever he was, who, for the Safety of the Emperor *Hadrian*, erected of his own Charges, and dedicated to *Jupiter* the *Thunderer*, a *Royal Banqueting-Houſe* (for ſo I take ΚΑΜΑΡΑ to ſignify) and a *Bed* of *State*; for after ΚΛΙΝΗ there is doubtleſs a Letter omitted, and it ought to be ΚΛΙΝΗΝ. The *Date* 445, agrees to the Year of *our Lord* 123, which was the 7th of the Reign of *Hadrian*: And the *Month* ΛωΟϹ is our *Auguſt*.

The next Day we paſſed by the *Ruins* of a large *Monaſtery* of the *Maronites*, as I gueſs it to have been, by an *Inſcription* we met with upon the *Capitals* of ſeveral *Marble Pillars*, which ſupported the Middle Iſle of a handſome *Church*, which was to this Effect:

†ΕΠΙ ΕΕΡΓΙȣ ΕΠΙϹΚό. Τȣ ΕΥΝΓϹΝ͂ ΜΑΡωΝΙȣ Fȣ ΧωΡΕΠΙϹΚȣ.

From thence we paſſed on, and came the ſame Night to *Euphrates*, and having travelled two *Days* on the Banks of that famous River, we came to the *Tents* of the *Kings* of the *Arabs*, who had furniſhed us with a Guide for our Voyage. With him we remained two Nights, and in two Days Travel yet more came back ſafe to *Aleppo*, having been but in the whole juſt 18 *Days*.

Remarks upon theſe Antiquities; *by Mr.* Edmund Halley, *n.* 218. *p.* 160.

4. The City of *Tadmor*, whoſe *Remains* in *Ruins* do with ſo much Evidence demonſtrate the once happy Condition thereof, ſeems very well to be proved to be the ſame City which *Solomon* the Great King of *Iſrael* is ſaid to have founded under that Name in the *Deſart*, both in 1 *Kings* ix. 19. and 2 *Chron*. viii. 16; in the *Tranſlation* of which, the *vulgar Latin Verſion*, ſaid to be that of St. *Jerom*, has it, *Condidit* Palmyram in Deſerto. And *Joſephus* tells us, that he built a City in the *Deſart*, and called it *Thadamora*; and the *Syrians* at this Day (ſays he) call it by the ſame Name; but the *Greeks* name it *Palmyra*. The Name is therefore *Greek*, and conſequently has no relation to the *Latin Palma*, and ſeems rather derived from Παλμυος or Πάλμυς, which *Heſychius* interprets βασιλεὺς ϖατὴρ, or perhaps from Παλμύτης, which (according to the ſame Author) was an *Egyptian* God. Neither is the Word תרמר, but תמר, that in *Hebrew*, ſignifies a *Palm-Tree*.

Antiquit. Jud. lib. VIII.

Hiſtory is ſilent as to the Fate and Circumſtances of this City during the great Revolutions in the ſeveral Empires of the *Eaſt*; but it may well be ſuppoſed, that ſo advanced a Gariſon as this was, being above 300 *Miles* from *Jeruſalem*, continued not long in the Poſſeſſion of the *Jews*, who immediately after *Solomon* fell into Civil Diſſenſion, and divided their Force: So that it is not to be doubted, but that it ſubmitted to the *Babylonian* and *Perſian* Monarchies, and afterwards to the *Macedonians* under *Alexander* and the *Seleucidæ*. But when the *Romans* got Footing in theſe Parts, and the *Parthians* ſeemed to put a Stop to their farther Conqueſts in the *Eaſt*, then was this City of *Palmyra*, by reaſon of its Situation, being a *Frontier*, and in the midſt of a vaſt ſandy *Deſart*, where Armies could not well ſubſiſt to reduce it by Force, courted and careſſed by the contending Princes, and permitted to continue a *Free State*, a *Mart*, or *Staple* for Trade, for the Convenience of both *Empires*, as is abundantly made out from the Words of *Appian* and *Pliny*.

De Bell. Civil. lib. V.

Appian tells us, That *M. Antonius*, after his Victory at *Philippi*, about 40 *Years* before *Chriſt*, ſent his Horſe to plunder the City of *Palmyra*, pretending only that they were not ſufficiently in the *Roman* Intereſt. Ὅτι Ῥωμαίων ϗ Παρθυαίων ὄντες ἔφοροι ἐς ἑκατέρους ἐπιδεξίως εἶχον, and that being *Merchants*, they conveyed the *Indian* and *Arabian* Commodities by the Way of *Perſia* into the *Roman* Territories, though the true Reaſon was their Riches: But the *Palmyrenes*, being informed of their Deſign, took care to prevent them, and ſo eſcaped Plunder; and this Attempt of *Antony*'s occaſioned a Rupture between the two Empires.

Nat. Hiſt. lib. V.

The Words of *Pliny*, above 100 *Years* after, do likewiſe teſtify, that this City then continued in the ſame Enjoyment of their Liberties. Palmyra *Urbs nobilis Situ, Divitiis Soli, atque Aquis amœnis, vaſto undique Ambitu Arenis includit Agros, ac velut Terris exempta a Rerum Natura, privata ſorte inter duo Imperia Summa* Romanorum Parthorumque, *& prima in Diſcordia ſemper utrinque Cura*. Whereby it appears not only that it was a *Commonwealth* in the Time of *Veſpaſian*, but the Situation thereof is truly deſcribed, as it were an Iſland of *fertile Land*, ſurrounded with a Sea of *barren Sands*. Such Spots, *Strabo* tells us, were frequent in *Libya*, and by the *Egyptians* were called *Abaſes*, whence, poſſibly, the Name of the *Abaſſyne* Nation is derived.

With theſe Advantages of *Freedom*, *Neutrality*, and *Trade*, for near two *Centuries*, it is not ſtrange that it acquired the *State* and *Wealth* anſwerable to the Magnificence of theſe noble *Structures*. But when the *Romans* under *Trajan* had made it appear, that there was no Compariſon between the Puiſſance of the *Parthians* and them (*Trajan* having taken *Babylon* and *Cteſiphon*, the then Seat of the *Parthian* Empire), the *Palmyreni* were at length determined to declare for the *Romans*; which they did, by ſubmitting themſelves to the Emperor *Adrian*, about the Year of *Chriſt* 130, when *Adrian* made his Progreſs through *Syria* into *Egypt*. And that magnificent Emperor, being highly delighted with the native Strength and Situation of the Place, was pleaſed to adorn and build it; when, as it is likely, he beſtowed on it the *Privileges* of a *Colony Juris Italici*, which it enjoyed (as *Ulpian* aſſures us); and the Inhabitants of the City in Gratitude were willing to call themſelves *Hadrianopolitæ*, ἐπικτισθείσης τῆς πόλεως ὑπὸ τοῦ Αὐτοκράτορος (ſays *Stephanus*). Nor is it unlikely, that many of thoſe *Marble Pillars* were the Gift of that Emperor, and particularly thoſe of the *long Porticus*; for that none of the *Inſcriptions* are before that *Date*; and it was uſual for the *Ceſars* to preſent Cities that had obliged them, with *Marble Pillars* to adorn their publick Buildings. Theſe here were not far to fetch, the neighbouring Mountains affording the *Marble Quarries*: But the Magnitude of the *Porphyry Columns* is indeed very remarkable, conſidering how far thoſe vaſt Stones muſt have been brought by Land-carriage to this Place; it being not known that any other *Quarries* yield it, except thoſe of *Egypt*, which lie about Mid-way between *Cairo* and *Siena*, between the *Nile* and the *Red-Sea*; the *Stone* being very valuable for its *Colour* and *Hardneſs*, and for that it riſes in Blocks of any Magnitude required. And it is a great Miſtake of thoſe who ſuppoſe it *factitious*.

From the Time of *Adrian* to that of *Aurelian*, for about 140 *Years*, this City continued to flouriſh and increaſe in Wealth and Power to that Degree, that when the Emperor *Valerian* was taken Priſoner by *Saporas*, King of *Perſia*, *Odenathus*, one of the Lords of this Town (which Name occurs in ſeveral of theſe *Inſcriptions*), was able, whilſt *Gallienus* neglected his Duty both to his Father and Country, to bring a powerful Army into the Field, and recover *Meſopotamia* from the *Perſians*, and to penetrate as far as their Capital City *Cteſiphon*; thereby rendering ſo conſiderable Service to the *Roman* State, that *Gallienus* thought himſelf obliged to give him a Share in the Empire. Of which Action, *Trebellius Pollio* (in the Life of *Gallienus*) has theſe Words: *Laudatur ejus* (Gallieni) *optimum factum, qui* Odenatum *participato Imperio* Auguſtum *vocavit, ejuſque* Monetam, *qua* Perſas *captos traheret, cudi juſſit: quod* & Senatus & Urbs & *omnis ætas gratanter accepit.* The ſame, in many Places, ſpeaks of this *Odenathus* with great Reſpect; and, mentioning his *Death*, he ſays, *Iratum fuiſſe Deum Reip. credo, qui interfecto* Valeriano *noluit* Odenatum *reſervare*. But by a ſtrange Reverſe of Fortune, this Honour and Reſpect to *Odenathus* occaſioned the ſudden Ruin and Subverſion of the City. For he and his Son *Herodes* being murdered by *Mæonius*, their Kinſman, and dying with the Title of *Auguſtus*, his Wife *Zenobia*, in Right of her Son *Waballathus*, then a *Minor*, pretended to take upon her the Government of the *Eaſt*, and did adminiſter it to Admiration; and when ſoon after *Gallienus* was murdered by his Soldiers, ſhe graſped the Government of *Egypt*, and held it during the ſhort Reign of the Emperor *Claudius Gothicus*. But *Aurelian* coming to the Imperial Dignity, would not ſuffer the Title of *Auguſtus* in this Family, though he was contented that they ſhould hold under him as *Vice Cæſaris*, as plainly appears by the *Latin Coins* of *Aurelian* on the one Side, and *Wabaliathus* (which Name is often found in theſe *Inſcriptions*) on the other, with theſe Letters, V. C. R. IM. OR. which P. *Harduin* has moſt judiciouſly interpreted, *Vice Cæſaris Rector Imperii Orientis*; but without the Title of *Cæſar* or *Auguſtus*, and with a *Laurel* inſtead of a *Diadem*. But both *Waballathus* and *Zenobia* are ſtiled CEBACTOI in the *Greek Coins*, made, it is probable, within their own Juriſdiction. Two of the *Latin* I have ſeen, and they are as deſcribed, excepting the Points.

But nothing leſs than a *Participation* of the *Empire* contenting *Zenobia*, and *Aurelian* perſiſting not to have it diſmembered, he marched againſt her; and having in two Battles routed her Forces, he ſhut her up, and beſieged her in *Palmyra*; and the Beſieged finding that the great Reſiſtance they made availed not againſt that reſolute Emperor, they yielded the Town; and *Zenobia* flying with her Son, was purſued and taken: With which *Aurelian* being contented, ſpared the City, and, leaving a ſmall Gariſon, marched for *Rome* with this *Captive Lady*: But the Inhabitants believing he would not return, ſet up again for themſelves, and (as *Vopiſcus* has it) ſlew the Gariſon he had left in the Place. Which *Aurelian* underſtanding, though by this Time he was gotten into *Europe*, with his uſual Fierceneſs ſpeedily returned; and collecting a ſufficient Army by the Way, he again took the City without any great Oppoſition, and put it to the Sword with an uncommon Cruelty (as he himſelf confeſſes in a Letter extant in *Vopiſcus*), and delivered them to the Pilage of his Soldiers. And it is obſervable that none of the *Greek Inſcriptions* are after the *Date* of this Calamity, which befel the City in or about the *Year* of *Chriſt* 272, as far as may be collected, after it had been 9 or 10 *Years* the Seat of the *Empire* of the *Eaſt*, not without Glory.

In this appears alſo the great *Utility* of *Coins* to illuſtrate Matters of *Hiſtory*; for by them alone it is made out, that there was ſuch a Prince as *Waballathus*, *Vopiſcus* ſingly mentioning him by the Name of *Balbatus*. And from the ſame *Coins* it appears that *Odenathus* had the Title of *Auguſtus* 4 *Years*, and *Waballathus* 6 at leaſt; and that the *firſt Year* of *Aurelian* was the 4th of *Waballathus*. And by the Teſtimony of *Pollio*, *Odenath* *natbus* was declared *Emperor* of the *Eaſt*, *Gallieno & Saturnino Coſſ.* which was *Anno Chriſti* 263. and died before *Gallienus*, but in the ſame Year, *viz.* *An.* 267. which, by the *Coins*, was the firſt of *Waballathus*. He therefore immediately ſucceeded *Odænathus*, and was, without doubt, his eldeſt Son by *Zenobia*, and not his Grandſon, the Son of *Herodes*, as ſome learned Men have ſuppoſed: For if *Zenobia* could not endure that *Herodes*, Son of *Odænathus* by a former Wife, ſhould ſucceed his Father in Prejudice to her Children, and for that Reaſon was conſenting to his Murder (as *Pollio* intimates in *Herodes* and *Mæonius)*, much leſs would ſhe endure the Title of *Auguſtus* in the Son of *Herodes*, and eſpecially when her own Sons were, as 'tis probable, elder than ſuch Grandſon. So that it is moſt likely that *Herennianus* and *Timolaus*, whom *Pollio* reckons among his thirty *Tyrants*, might be the younger Sons of *Zenobia*, on whom alſo, out of motherly Affection, ſhe might beſtow the ſame Titles of Honour.

But it muſt be obſerved, that in the *Greek Coins* this Prince's Name is uſually written ΑΥ Τ ЄΡΜΙΑϹ ΟΥ ΑΒΑΛΛΑΘΟϹ ΑΘΗΝΟΥ, as *Triſtian* ſays he found it upon ſeveral *Medals*; but *Patin* has the laſt Word only ΛΘΗ. I ſhould be glad to peruſe ſome of theſe curious *Coins*, eſpecially if found in or near *Palmyra*; but I am inclinable to believe that his true Name was *Æranes Waballathus* (as was one of his Progenitors, in the *firſt Inſcription* Vid. Sup. 3.
of Dr. *Halifax)*, though perhaps the remoter Cities of *Aſia* and *Ionia* might, by Miſtake, write it *Hermias*. And it is probable that ΑΘΗΝ might be for the firſt Letters of the Name ΟΔΗΝΑΘΟϹ, which in *Syriac* begun with an *Aleph*; and the Δ was with thoſe People uſed inſtead of Θ, as we ſee the *Month Xanthicus*, written Ξανδικὸς in many of theſe *Inſcriptions*, which, doubtleſs, was pronounced like *D blæſum*, or the *Saxon* Ð.

Though this City was at that time ſo roughly treated by *Aurelian*, yet it is certain that he did not burn it, or deſtroy the Buildings thereof: And though *Zoſimus*, on this Occaſion, uſes the Words Τὴν Πόλιν κατασκάψας, yet that ſeems only to relate to his demoliſhing the *Walls* and *Defences* of the Place; and that Emperor's own Letter, extant in *Vopiſcus*, doth ſufficiently ſhew that he ſpared the City itſelf; and that he took care to reinſtate the beautiful *Temple* of the *Sun* that was there, which had been plunder'd by his Soldiers. However, the Damage then ſuſtained was never retrieved by the Inhabitants; and I do not find that ever this City made any Figure in *Hiſtory* after it: Yet the *Latin Inſcription* ſeems to intimate, as if *Diocleſian* had Vid. Sup. 5.
reſtored their *Walls* within *thirty Years* after. About the Year of *Chriſt* 400. it was the *Head-Quarters* of the *Legio Prima Illyricorum*; and though *Stephanus* gives it no better Title than φρούριον, yet it appears to have been an *Archbiſhop*'s *See*, under the *Metropolitan* of *Damaſcus*. To ſay in what Age, or from what Hand, it received its final Overthrow, which reduced it to the miſerable Condition it now appears in, there is no Light in any of our *Hiſtorians*; but it is probable it periſhed long ſince in the *obſcure Ages* of the World, during the Wars of the *Saracen* Empire; and being burnt and deſolated, it was never rebuilt; which occaſions the *Ruins* to lie ſo intire, in a Manner, as they were left, nei-

ther being uſed to other Structures on the Place, nor worth carrying away, becauſe of the great Diſtance thereof from any other City.

As to the *Geographical* Site of *Palmyra*, *Ptolemy* places it in the *Latitude* of *Tripoly* on the Coaſt of *Syria*, and 4 *Deg.* more Eaſterly; *viz.*

Παλμύρα. οαϛ'. λδ.

And he makes it the *Capital* of 16 Cities in *Syria Palmyrena*, whereof *Alalis*, *Danaba*, and *Evaria*, were afterwards *Biſhops Sees*. *Pliny* calls it CCIII *Miles* from the neareſt Coaſt of *Syria*, and CCCXXXVII from *Seleucia ad Tygrim* near *Bagdat* (which Numbers are erroneouſly printed 252, and 537, in moſt *Editions*, contrary to the Authority of the *MSS.*). *Joſephus* places it *one Day's Journey* from *Euphrates*, and *ſix* from *Babylon*, which muſt be underſtood of *Horſeman's Journeys* of about 60 *Miles per Diem*, it being more than ſo much from this City to *Euphrates*. *Ptolemy* alſo mentions a *River* running by *Palmyra*, which did not appear to our Travellers, unleſs that Gut or Chanel wherein they were overflowed by the Rain-waters were the Bed thereof; which may poſſibly run with a conſtant Stream in the Winter, or Times of much Rain: But this (as the Rivers of *Aleppo* and *Damaſcus* at this Day) is made by *Ptolemy* to have no *Exit*, but to go off in *Vapour*, and to be *imbibed* by the *thirſty Earth* of theſe *Deſarts*.

Ib. *p.* 168. The *Æra*, or Account of *Years*, obſerved by the *Palmyreni* in theſe *In-*
n. 204. *p.* 921. *ſcriptions*, is evidently that of *Seleucus*, called afterwards *Dhilcarnain* or *Bi-*
cornis, by the *Arabians*, and by them kept in Uſe till above 900 *Years* of
Chriſt, and not that of the *Death* of *Alexander*. This may be demonſtrated
N. 218. from the 5th *Inſcription* of Dr. *Halifax*, wherein *Alexander Severus* is ſtiled
ΘΕΟΣ, that is, after the Death and Conſecration of that Emperor, or after
the *Year* of *our Lord* 234. and from the Name of *Julius*, who, when this *Inſcription* was put up, was *Præfectus Prætorii* (and could be no other than *Julius Philippus Arabs*, who might be eſteemed by the *Palmyreni* as their Countryman), it follows, that it was in the laſt Year of *Gordian*, *An. Chr.* 242. or 243. and that Emperor being ſoon after murdered by the Treachery of this *Philip*, who ſucceeded him, and his Treaſon coming afterwards to Light, it is not ſtrange that his Name was purpoſely effaced in this *Inſcription*. The *Date* thereof, *An.* 554. ſhews the Beginning of this Account 311 or 312 *Years before Chriſt* coincident with the *Æra* of *Seleucus*, which was likewiſe obſerved by ſeveral other Cities in the *Eaſt*.

I ſhall not undertake the Part of a Critick on theſe *Inſcriptions*, but only make ſome few Remarks on them, ſuch as occurred while they paſſed through my Hands.

1. That the more antient of theſe *Inſcriptions*, dated before the *Year* 500.
do no-where make uſe of *Roman Prænomina*, which yet are very frequent in
them that follow, particularly *Julius*, *Aurelius*, and *Septimius*, taken up by theſe
People out of Reſpect to the *Emperors* that bore thoſe Names; and conſe-
Halif. *Inſcr.* 1. quently, that *Septimius Odænathus* was moſt probably the ſame who was af-
terwards

terwards *Auguſtus*. That Name growing in Uſe in the Reign of *Septimius Severus*, under whom, or his Son *Caracalla*, this *Odænathus* was certainly born; and this *Monument* being erected by him whilſt he was yet a private Man, and he afterwards attaining the *Imperial Dignity*, it was neceſſary the *Inſcription* of his *Tomb* (which perhaps was that ſingle one that was all of *Marble)* ſhould be changed: Upon which Occaſion this Stone might be brought back into the Town, and, after its Deſtruction, be clapp'd up caſually over the *little Gate-way* where now it ſtands.

2. ΚΑΤЄ ΛΘϽΝΤЄϹ ЄΙϹ ΟΑΟΓЄϹΙΑΔΑ ЄΝΠΟΡΟΙΑΝ ЄϹΤΗϹΑΝ: *Deſcendentes* Vologeſiada *Commercium ſtabiliverunt*, *An.* 558. *ſive An.* Chriſti 247. Whereby it appears, that this People having had their Trade interrupted by the Wars between the *Romans* and the *Perſians*, under *Gordian*, did now ſend an Embaſſy to the Court of *Sapores*, King of the *Perſians*, to get it re-eſtabliſhed, which ſucceeded according to their Deſires. *Vologeſias* was a City built by *Vologeſes*, King of the *Parthians* in the Time of *Nero*, on the *Euphrates*, below *Babylon*: *Ptolemy* calls it Οὐολγεσιάς: *Stephanus*, Βλογεσία: *Ammianus*, Vologeſſia; and *Pliny*, Vologeſo-cirta. Hal. *Inſcrip.* 4. *Lib.* VI.

3. ΚΑΙ ΟϒΚΟΝΙϹωΝΑ ΦЄΙΔΗϹΑΝΤΑ ΧΡΗΜΑΤωΝ. I ſubmit it to the Judgment of the *Criticks*, whether this faulty Place may not be amended, by reading it ΟϒΚ ΟΙΚЄΙωΝ ΑΦЄΙΔΗϹΑΝΤΑ, &c. as likewiſe whether ΔΙϹΜΑΛΧΟϒ, in the ſame *Inſcription*, may not be inſtead of ΜΑΛΧΟϒ ΤΟϒ ΜΑΛΧΟϒ, which is the ingenious Conjecture of that excellent Grammarian Mr. *Will. Baxter*. Hal. *Inſcrip.* 5.

4. *Septimium Vorodem Procuratorem Ducenarium Auguſti*, &c. ΑΡΟΑΠЄΤΗΝ. This Word, if *Greek*, is faultily tranſcribed; and in one Copy I have ſeen, the O is very ſmall, as I ſuppoſe it on the *Stone*; which might occaſion the Tranſcribing thereof without it in the former Voyage: So that it is moſt probable, that it is the *Remains* of ſome other Letter almoſt worn out. I conjecture it to have been ΑΡΤΑΓЄΤΗΝ, Π being taken for Γ; and that this *Septimius* was *Præfectus Annonæ*, having the Care to ſee that the City was ſufficiently provided with Bread; which was a moſt neceſſary Officer in a Place that muſt needs be furniſhed with *Corn* from Abroad. And this ſame *Septimius*, in another *Inſcription*, is ſtiled .... ЄΟΔΟΤΗΝ ΤΗϹ ΜΗΤΡΟΚΟΛωΝЄΙΑϹ *lege* ΚΡЄΟΔΟΤΗΝ, which ſhould ſignify that he was Diſtributer of the Emperor's Munificence in *Fleſh* to the People. These *Inſcriptions* bear Date in *April*, *An. Dom.* 267. not long before the Death of *Odænathus*, who is herein ſtiled ϹЄΒΑϹΤΟϹ; and it is not improbable but he might inſtitute ſuch a Cuſtom, as at the publick Charge to give the People a Largeſs in *Fleſh* on particular Days, to reconcile them to the Dominion of their fellow Citizens. This is certain, that *Aurelian* firſt inſtituted ſuch a Cuſtom of giving *Fleſh* at *Rome*. The Words of *Vopiſcus* are, *Idem* Aurelianus & Porcinam Carnem Populo Romano *diſtribuit*, *quæ hodieque dividitur:* Which Cuſtom continued till the Time of *Conſtantine*, when (according to *Zoſimus*) one *Lucian*, who had this *Office* of diſtributing Hal. *Inſcrip.* Vid. *Sect.* XI. 1. *Inſcrip.* 2. Hal. *Inſcrip.* 10.

Swine's *Fleſh* at *Rome*, had Intereſt enough among the People to ſet up *Maxentius* for Emperor; and *Salmaſius* aſſures us, that it was not diſcontinued till the Time of *Heraclius*. It will not therefore ſeem ſtrange, if I ſuppoſe *Aurelian* might find that Cuſtom at *Palmyra*, and at his Return from thence inſtitute the like at *Rome*.

I am inclined to believe, that not only the 6, 7, and 10 *Inſcriptions* of Dr. *Halifax*, but alſo the 11, were in Honour of the ſame *Septimius Vorodes*, who ſeems to have been a great Favourite of *Odænathus*, and was, without doubt, reſpected by the *Romans* on that Account, whom I conclude to have effaced all the *Memorials* of *Zenobia* and *Waballathus*, inſomuch that no one appears, among thoſe many taken, that was ſet up during the ſix Years they reigned. The Name *Vorodes* ſeems the ſame with *Orodes*, which was the Name of the King of the *Parthians* that ſlew *Craſſus*: And the *Perſians* having, about 40 *Years* before, expelled the Race of the *Arſacidæ*, it is not improbable but the *Remains* of that *Royal Family* might fly for Succour to *Palmyra*, and this *Vorodes* might be one of them.

Hal. *Inſcrip.* 8. 5. In two other Copies of theſe *Inſcriptions*, the 8th is read Σεπτίμιον Ἀιράνην Ὀδαινάθου, and not Ὀδαινόθου, as in this Copy; and perhaps ought rather to be Ὀδαίναθον, as being the *Inſcription* under a *Statue* of the ſame *Odænathus*, who is here, as well as on his *Tomb*, ſtiled *Illuſtriſſimus Patricius*; but without a *Date*.

Hal. *Inſcrip.* 5. & 14. 6. ΥΠΟ ΙΑΡΙΒωΛΟΥ ΘϵΟΥ. It cannot well be doubted, but that this *Deus Jaribolus* is the ſame with what *Gruter* and *Spon* (in the *firſt* of his *Inſcriptions*) reads ΑΓΛΙΒωΛω. By the Figure of the *Idol* extant in *Spon*, it appears, that this *God* was made with the *Moon* upon his Shoulders, and conſequently was the *Deus Lunus* worſhipped by the *Syrians*, whoſe Name, in the Language of that Country, could not be better expreſſed than by *Jarebból* ירח בועל *Dominus Lunus*. Whence I am induced to believe, that *Gruter* miſtook it, ΑΓΛΙΒωΛω for ΑΓΛΙΒωΛω, the I in the Beginning, and the lower Part of the round Stroke of the P being effaced, ſo as to paſs for Γ.

By the way it is remarkable, that the Perſon who dedicated this *Monument*, in *Gruter* and *Spon*, is ſtiled Λ. ΑΥΡ. ΗΛΙΟΔωΡΟϹ; and the ſame Name occurs in a broken *Inſcription*, which Mr. *Halifax* omitted, as being too imperfect. It ſtood on the Right Hand of the *Entrance* into the little *Temple*, and was thus:

ΛΟΥΚΙΟΥ ΑΥΡΗ[ΛΙ]ΟΥ ----- ΗΛΙΟΔωΡΟΥ ΤΟΥ.

And after a Blank of three Lines all worn out, except one ſingle O, there followed,

Hal. *Inſcrip.* 9. [ΤϵΙ]ΜΗϹ ΧΑΡΙΝ ϵΤΟΥϹ ---- ΜΗΝΟϹ [ΑΠ]ϵΛΛΑΙ[ΟΥ].

And that imperfect ninth *Inſcription* ſeems to have Relation to the ſame Name.

7. ΜΑΛϵΝ-

7. ΜΑΛЄΝΤΟΝ ΚΑΙ ΑΓΡΙΠΠΑΝ *lege* ΜΑΛΗΝ ΤΟΝ ΚΑΙ Hal. *Inſcrip.* 15. ΑΓΡΙΠΠΑΝ, it being written ΜΑΛΗΝΤΟΝ, with H, in two other Copies I have ſeen, whereby the Senſe is cleared.

8. ΑΓΑΘΑΝΓЄΛΟC ΑΒΙΛΗΝΟC ΤΗC ΔЄΚΑΠΟΛЄΟC, *Agàthan-* Hal. *Inſcrip.* 18. *gelus Abilenus Decapolitanus*; *Patronymicè.* There were in thoſe Parts two Cities known by the Name of *Abila*, to diſtinguiſh which, the one was called *Abila Lyſaniæ*, from the Name of the *Tetrarch*, St. *Luke* ch. iii. 1. and is placed by *Ptolemy* (in his *Cœlo-Syria*) about Midway between *Damaſcus* and *Heliopolis:* The other in *Judea*, called *Abila ad Jordanem*, deſcribed by *Joſephus*, in many Places, to lie over-againſt *Jericho*, near the *Dead Sea*: *Decapolis* was ſo called from its *ten Cities*, enumerated by *Pliny*; and with Lib. V. & XVIII. them he reckons up, among others, the *Tetrarchy* of *Abila*, in the ſame *Decapolis*; which demonſtrates the *Abila Decapolis* and *Abila Lyſaniæ* to be the ſame Place. And though it cannot be denied, but that ſome of *Pliny*'s *ten Cities* are not far diſtant from that near *Jordan*; yet it doth not appear that ever this other had the Title of a *Tetrarchy*. Here it is to be obſerved, that what *Pliny* calls *Decapolis*, *Ptolemy* makes his *Cœlo-Syria*; and the *Cœlo-Syria* of *Pliny* is that Part of *Syria* about *Aleppo*, formerly called *Chalcidene*, *Cyrrhiſtice*, &c.

What this Town of *Tiebe* was antiently called, is not ſo eaſily conjectured: But if the Numbers of *Ptolemy* may be confided in, it is very near the Situation of a City he calls *Oriza*; and perhaps his *Adada* may be our *Soukney*, and his *Ræſapha* what is now called *Arſoffa*.

It is taken for granted, that *Old Aleppo* was antiently the City of *Berrhæa*, and there want not antient Teſtimonies to prove it; which being granted, I think I may, without Scruple, conclude, that *Adrene*, mentioned in both the Voyages, is the *Ruins* of the City *Androna*, and *Eſree* that of *Seriane*; both mentioned in the *Itinerary* of *Antoninus*, in the *Journey*, *à Dolicâ Seriane*. But this whole Country is laid about *Half* a *Degree* more ſoutherly than it ought, by *Ptolemy*, who places *Berrhæa* in *Lat.* 36 *Deg.* For the Meridian Altitude of the Tropical Sun at *Aleppo* is found but 77 *Deg.* whence the *Lat.* 36 *Deg.* 30 *Min.* as it was obſerved there *An.* 1680. by three ſeveral *Quadrants*.

By the ſame Obſervation a much greater Error is amended in the *Latitude* of *Aleppo*, in the *Rudolphine Tables* of *Kepler*, who ſuppoſes *Aleppo* to have been the antient *Antiochia ad Taurum*; and accordingly places it in *Lat.* 37 *Deg.* 20 *Min.* wherein he is followed by *Bullialdus*, and others; and ſeveral Maps have copied the Miſtake. But a much greater Uſe of it is, that thereby we are aſſured that the City of *Aracta*, wherein *Albatani* made his Obſervations, was, without doubt, the ſame which is now called *Racca* on the *Euphrates*; of which Town an Account may be ſeen in *Rauwolf*'s *Voyages*, and which was not many *Miles* below the Place where our Travellers firſt came on the *River:* And if *Arecca*, in the *Language* of this Country, relates to *Victory* (as is ſaid above); it was, doubtleſs, antiently the City of *Nicepho-* Vid. *Oct.* 8. *rion*, built by *Alexander the Great*; with which the Situation exactly agrees.

XLI. Dr.

An Inſcription in the Language of the Palmyreni; by Mr. Octavian Pulleyn. *n.* 228. *p.* 537. *Miſc. p.* 3. *Fig.* 65.

XLI. Dr. *Hallifax* calling at *Rome* in his Return home from *Aleppo*, *An.* 1696. enjoined me to find out the *Inſcription* in the Language of the *Palmyreni*, mentioned by Dr. *Spon*. I waited upon S. *Fabretti*, Canon of St. *Peter's*, and by him I was fully informed to my Purpoſe. He lent me alſo a Draught of it, which I carried to the *Vinea Ceſarini*, about a Mile without the *Porto del Popolo*, to compare it with the *Original*; but I found it not exact: Wherefore I took a wet Paper, and having firſt cleared the Letters with a Bodkin, laid it on the *Characters*, and preſſing it with a Handkerchief, took it off very fair; then letting it dry, I went over it with my Pen.

On the Top of the *Cypreſs*, which is upon one of the Sides of the *Marble*, there is a *Label* for an *Inſcription*, though nothing upon it; and juſt below it, on the Left Side, part of a *Boy* appears out of the *Tree*, with a *Lamb* upon his Shoulders, which is omitted in Dr. *Spon*. The *Stone* appeared to me to have remained unmoleſted for ſome time, becauſe, from the Ground, the *Inſcription* was over-run with *Ivy*, the Wood of which had crept into the Letter, and over the *Gryphons* and *Figures* above it.

Draughts of ſeveral Inſcriptions *and* Characters *at* Perſepolis; *by Mr.* F. A. *n.* 201. *p.* 775. *Fig.* 66, & 67.

XLII. 1. I have lately retrieved ſome *Fragments* of *Papers* relating to antique and obſcure *Inſcriptions* at *Perſepolis*, taken in *Nov.* 1667. by Mr. *S. Flower*, Agent in *Perſia* for our *E. I. Company*, who died ſuddenly ſoon after, and left them diſperſed in ſeveral Hands.

Fig. 66, 67. Theſe two *Characters* are engraven on the Breaſt of two *Horſes* cut out of the Mountain of *black Marble* at *Noctureſtand*, diſtant a *League* from *Chahelmenare*, or the antient *Perſepolis*; one whereof is ſaid to be *Alexander's*, the other *Ruſtram's*, a famous Hero, ſuppoſed to have lived about the Time of *Cambyſes*. Mr. *Flower*.

Fig. 66. This *Character* hath ſome Similitude with the antient *Hebrew*; but the *Perſians* would have it their own, though they underſtand not a Letter. Mr. *F.*

Fig. 68. *Fig.* 68. Theſe two Lines were writ intire on *Ruſtram's Horſe*. Mr. *F.*

Fig. 69. *Fig.* 69. This is the *(Arabick) Perſian Character* engraven at *Perſepolis*, not above 500 *Years* ſince, and is little different from the Writing uſed at this Day. Mr. *F.*

Fig. 70. *Fig.* 70. This *Character*, whether it be the antient Writing of the *Gaures*, or *Gabres*, or a kind of *Teleſmes*, is found only at *Perſepolis*, being a Part of what is there engraven on *white Marble*, and is by no Man in *Perſia* legible, or *underſtood* at this Day.

A learned *Jeſuit* Father, who deceaſed 3 *Years* ſince, affirmed this *Character* to be known and uſed in *Egypt*. Mr. *F.*

It ſeems written from the Left Hand to the Right, and to conſiſt of *Pyramids*, diverſly poſited, but not joined together. As to the Quantity of the *Inſcriptions*, *Herbert* reckoned in one large Table 20 *Lines* of a prodigious Breadth. Of this Sort here are diſtinct Papers, each of ſeveral *Lines*.

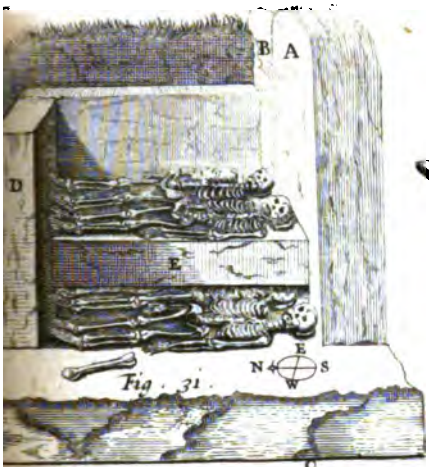
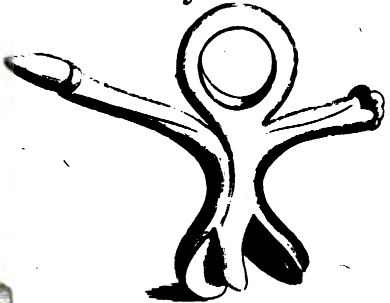
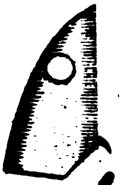


Fig. 31.

Fig. 40.





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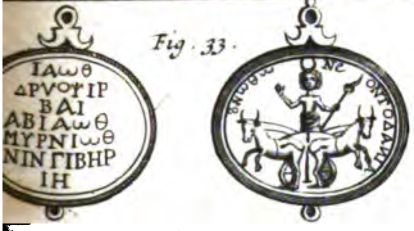

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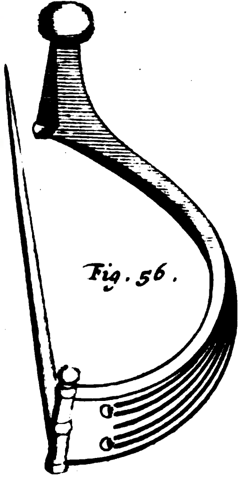
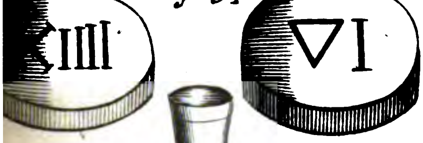


Fig. 4

Fig. 34.



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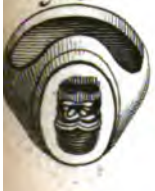
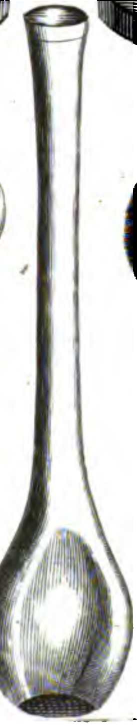


Fig. 39



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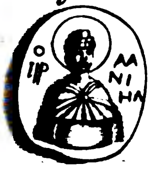

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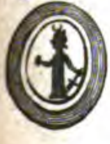

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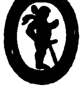
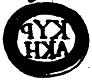


Fig. 38.



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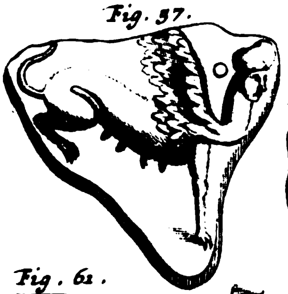


Fig. 58.

Fig. 59.

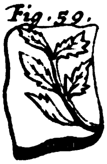
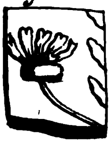
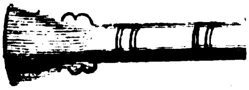


Fig. 61.





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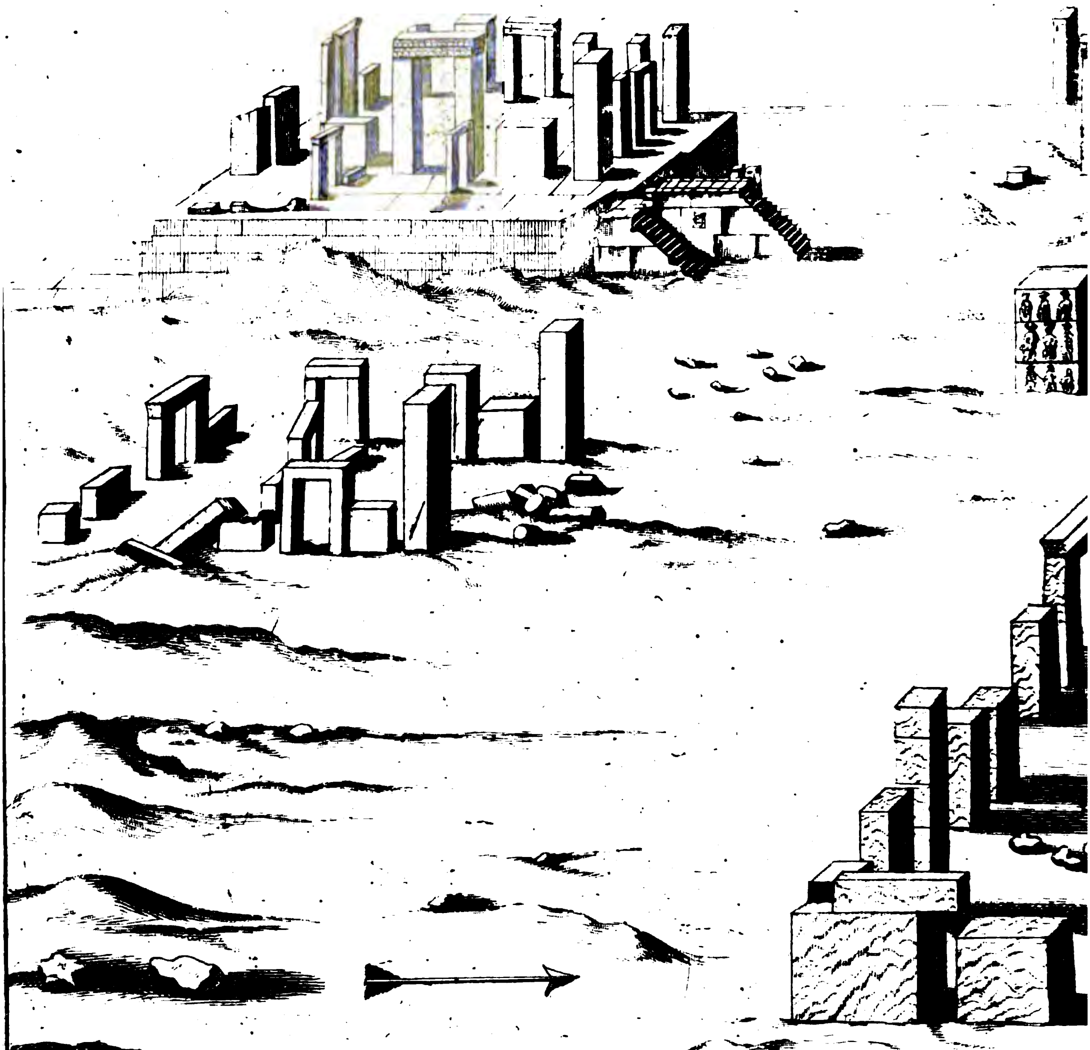


Fig. 71. This *Character* is likewiſe engraved at *Perſepolis* of like *Antiquity* with the former. It has ſome Affinity with the *Syriack* and *Arabick*, and has been pretended to be underſtood by ſome of the *Padres*. Mr. *F.* *Fig.* 71.

2. To the *Inſcriptions* found at *Perſepolis*, I ſhall here add the *Draughts* of part of the *Stone-Work* of that proud Palace, given me by the Perſon himſelf that drew them upon the Place. *The* Ruins *of* Perſepolis; *by Mr.* Nic. Witſen. *n.* 210. *p.* 117. *Fig.* 72, 73.

XLIII. I have ſpent 3 *Months* of 1669. in a Voyage to the *Upper Egypt*, accompanied with my Brothers the F. *Charles* and *Francis*, always aſcending upon the *Nile* as high as 300 *Leagues* above *Cairo*, being 2 *Days* Journey on this Side of the *Caſcatas* of the *Nile*. I there admired Store of *Idol-Temples* yet intire, together with very antient *Palaces* filled with *Statues* and *Idols*. I counted in one Place alone 7 *Obeliſks* like thoſe at *Rome*, and about 120 *Columns* in one *Hall*, of the Bigneſs of 5 *Braſſes*, full, within and without, from the Top to the Bottom, with *Hieroglyphick Letters*, and with *Figures* of falſe Deities. I found *Statues* of *white Marble*, and ſome of *black*, of the Bigneſs of 3 Perſons, with a Sword on their Side, and of an hard Stone, namely, a *Man* and a *Woman*, at the leaſt of the Height of 8 *Fathoms*, though ſeated in *Chairs*, but well proportioned; and two others of *black Marble* repreſenting *Women*, with *Globes* on their Heads, and extravagant Coverings thereon, which were two *Foot* broad from one Shoulder to the other. *Obſervations on* Upper Egypt; *by* F. Brothais. *n.* 71. *p.* 2151.

We lighted not but in two Places where *Antiquities* were to be ſeen; one whereof is called *Lozor*, and the other *Candion*, which is a very antient *Caſtle*, eſteemed, by the Tradition of the Country, to have formerly been the *Reſidence* of a King. Nor indeed is this hard to believe, even before one enters into it, conſidering in the Avenues of the ſaid *Caſtle* a great Number of *Sphinxes* ſtanding in a Row, and turning their Heads towards the *Alley*. It is known, that this is an *Idol* having the *Head* of a *Woman*, and the *Body* of a *Lion*, which was once a famous *Deity* among the *Egyptians*. They are diſtant from each other about 2 *Paces*, and are 20 *Feet* long. I walked in 4 *Alleys* ending at 4 *Gates* of the *Caſtle*; and, for ought I know, there may be more of them, ſeeing I went but half round the *Caſtle*, which is very ſpacious: I reckoned 60 of them on one Side of one *Alley*, and as many over-againſt it, and 51 in another *Alley*, all well meaſured. The *Alleys* are of the Largeneſs of a *Pall-mall*; the *Gates* of the *Caſtle* are of an extraordinary Height, covered with moſt excellent *Stones*. Meaſuring one, which maketh the Height of one of them, I found it 26½ *Foot* long, and proportionably thick. I believe that there are above a *Million* of *Figures* in Profile, none in Front: I ſpeak of thoſe that are graven on the *Walls* and *Pillars*. That which moſt pleaſed me was the *Ground*, where the *Azure* and the other Colours, which are like *Enamel*, appear as freſh as if they had been laid on but a *Month* before. There are *Temples* ſo ſpacious, that 3000 *People* may ſtand on the *Roof* with Eaſe. In the ſame *Caſtle* there is a *Pond*, the *Water* whereof is *bitter*, ſet about with fine *Stones*. This *Water* is ſaid *perfectly* to *whiten Linen* all alone; which I tried not, but we dipp'd a Handkerchief in it, which kept the *Scent* of *Soap* for 4 or 5 Days.

There are a great Number of *Chriſtian Cophthes* in that Country, who have many *Monaſteries* and *antient Churches*, but poor. We have paſſed many Places, where was neither *Prieſt* nor *Church*; but only the poor People, like *Sheep* without a *Shepherd*.

An Account of the Porphyry Pillars *in* Egypt; *by Dr.* Robert Huntington. *n.* 161. *p.* 624.

XLIV. It may be (I think) taken for granted, that there is no Quarry, or rather Rock of *Porphyry*, in all the *lower* Parts of *Egypt*: For ſo far as the *Nile overflows* is perfect *Soil*, and the Boundaries of this *Overflow* (which are never 10 *Miles* from the Channel, that I ſaw, generally ſcarce ½ of it, and in ſome Places but a *Mile* or *two*, the *Delta* ſtill excepted, which is univerſally *covered*, all but the *North* Side to the Sea, and a little to the *Eaſt* for ſome *Miles* above *Damiata*) are riſing Hills of *Sand*; beyond which is perfect *Deſart*, upon the *Africk* Side the *Libyan*. [Higher *South*, I have been told, there are *Rocks* nearer the *River*, and in ſome Places ſtreighten it; but] under theſe *Sands* is a *yielding Stone*, not much harder than *Chalk*, though not ſo white, and very eaſily managed; as at the *Mummies*, deep ſpacious Vaults, which were the old *Repoſitories* for the *Dead*. And the like may be alſo ſaid of thoſe *Cells* or *Sepulchres* which are hewn purely out of the *rocky* Earth ¾ of a *Mile* on the *South* of *Alexandria*. Albeit nearer the Sea there are *Stones* of a *harder* Kind, and with which they *build*; but by their mouldring away, as appears by the *Remains* of Houſes within the *Walls* of the City, it is plain they can't endure the *Weather*, which is ſufficiently corroding there; the *Iron* which once plated their thick wooden *Gates* being moſtly *eaten away*, and the deep *Characters* upon the Sides of theſe very *Porphyry Pillars* exceedingly *defaced*. Indeed about *Memphis*, *i.e.* by the *Pyramids*, they have a *milder* Air, and the *Hieroglyphicks* cut in theſe *Stones* will laſt well enough, till they ſhall be removed into a *rougher*; but then they'll *crizle* and *ſcale*, as I found by ſad Experience. For having procured *four Stones*, the beſt marked with thoſe *Figures* of *Antiquity* I could meet with, and ſent them down to *Alexandria*, in order to their Tranſportation for *England*, I found them, upon my *ſecond Voyage* into *Egypt*, very much injured, being put into the *Cuſtomhouſe-yard* (where they lie ſtill embargoed) by the *Aga*. But yet farther into the Country there are Mountains of *harder Stone*. In the *Nitrian*, now the *Deſert* of *St. Macarius*, and not far from the Lake where the *Latroon*, or true *Nitre*, incruſtates upon the Top of the Water, there are many, and ſome of them not utterly unlike *Porphyry*. That which neareſt reſembles its *Colour*, though not its *Conſiſtence*, is the *Vein* that produces the *Eagle-Stone*, of which there are many in the *Bahr Batama*, a great ſandy Valley: But theſe *Stones* are of a different Complexion from *Porphyry*.

However, I cannot pronounce that there is no *Porphyry* hereabouts: For in the chief *Monaſtery* of the four now remaining (of 366, as many as are Days in the longeſt Year), dedicated to the *Bleſſed Virgin*, the two *Stones* which ſecure their Entrance are of the like, if not the very ſame Subſtance

Fig. 66.

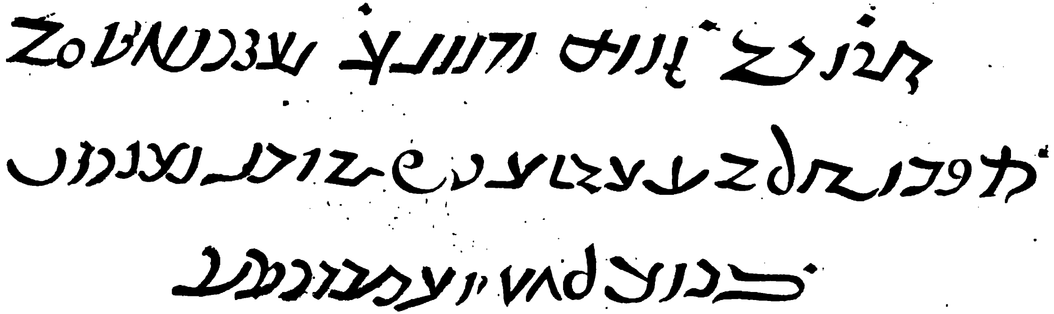
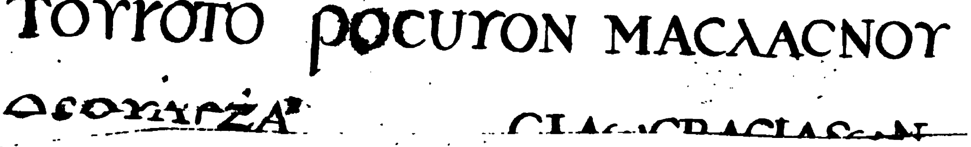
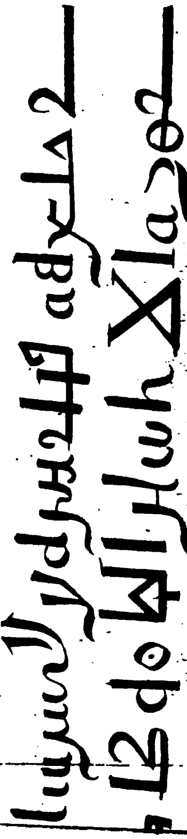


Fig. 67.





ſtance; which I more particularly obſerved, upon the Account of their ingenious Contrivance; for theſe poor People, lying otherwiſe at the Mercy of the roving *Arabs*, with theſe two *Mill-Stones* (for that's their Make) thus make good their *Gate* againſt them (or rather their Paſſage) into which they run them, and then drive a great wooden Wedge between them on the Inſide, which ſo faſtens them that they cannot be looſed, but upon the Inſide neither. And of ſuch a ſort of *Porphyry* is the noted *Sphynx* (a mighty *Head* and *Shoulders* 110 *Feet* in Compaſs) yet ſtanding by the *Northern Pyramids*. I have indeed been told of the Place upon Mount *Sinai*, whence this *Porphyry* came; but ſo they ſhew the very *Rock* where the two excellent double *Rows* of *Pillars* in the *Church* of *Bethlem* were hewn; tho' I went away ſatisfied that it was a quite different Sort of *Stone*. Another tells of a *Pillar* of the ſame Make yet lying there; and if this be certain, you need ſeek no further: Albeit, I muſt tell you, that the *Stones* brought thence, with the Repreſentation of a *Buck* (it muſt needs be called) upon them, tho' *reddiſh*, are of a much finer, and more even Texture. Father *Carlo Franciſco d'Orleans*, now Superior of the *Capucines* at *Cairo*, who went 300 *Leagues* up the *Nile* in the *Year* 1669, told me of many *Temples*, *Statues* and *Pillars* at that Diſtance, though I cannot be ſure he ſaid there were any of *Porphyry*. But ſince it was in *Thebais*, why may we not ſuppoſe them of that black, white and red ſpeckled *Thebaick Marble*, famous in the World, and wherewith the leſſer *Pyramid* perhaps was *cruſted*, yet to be ſeen upon the Ground about it, which when poliſhed looks finely?

Thoſe which I have myſelf ſeen are *one* of them at the *Matarea*, 3 or 4 *Miles* Eaſt of *Grand Cairo*, and 2 at *Alexandria*, juſt within the *Wall* upon the North-ſide of the City (for *Pompey*'s *Pillar*, as they call it ½ *Mile* without the *Gate* to the South, is quite of another Make and Matter) one of theſe is thrown down and broken into Pieces, but was of the ſame Dimenſions for Breadth and Thickneſs with the other. The *Franks* call them *Aguglia*'s; the *Engliſh* particularly *Cleopatra*'s *Needles*; but the Inhabitants content themſelves with the general Name of *Pillars*. They have no *Baſis* or Pedeſtals above Ground; and if they ever had, they muſt needs be very deep in the Earth. The *Stone* itſelf is ſomething more lively than the *Porphyry* of St. *John*'s *Font* (for by that Name it is known) at *Epheſus*; much more vivid than thoſe four tall ſquare *Pillars* at *Tadmor* (in its middle Age *Palmyra*) which are each of them but of, I think, one Piece; whilſt all the reſt, exceeding many, of another Sort of *Stone*, are of ſeveral Pieces and round. The Clearneſs of its Complexion may perhaps be attributed in part to the Air, which corrodes them eſpecially upon the *North* and *Eaſt*. The *Hieroglyphick Character*, with which they are engraven, is perhaps the *aboriginal Ægyptian Letter*, long ſince worn out of common Uſe in the Country, as the *Samaritan* (ſo it is now generally called) was amongſt the *Jews*; and bears Proportion with the *China* (now in Uſe) where each Note repreſents a Word, or rather an intire Signification. And moreover it ſeems to be wrote the ſame Way, from the *Top* to the

Bottom, as may be ſeen on the Board I brought from a Door in the Village *Succara*, which is (next to the *Mummies*) the largeſt Piece of *Ægyptian Writing* perhaps at this Day in *Europe*. I confeſs, that in the *Vaults*, or *Prieſts Chambers*, cut out of the Rock cloſe by the ſecond *Pyramid*, the whole *Walls* are inſcribed therewith; but I ſpeak of an *Original*. And if all that is there *written* were but exactly *copied*, it might be then lawful to hope, that the *Language* ſo long ſince dead and buried in the Houſe of Bondage, might have its Reſurrection in the Land of Liberty.

That ſuch vaſt *Monuments* might be removed from Place to Place is difficult indeed, but not impoſſible; for ſome of theſe *Mountains* are near the *Red Sea*; and *Suſs* from *Cairo* is but two or three Days from the *Nile*; leſs. How poſſible it is to convey mighty Weights by Water, let the *Obeliſks* at *Rome* declare, which were all of them brought from this very Country: And that ſuch things may be done by Land too, though not by every one, is plain enough, becauſe we ſee they have been done. At *Baalbec*, which is 14 *Hours* from *Damaſcus* (for thence I went, accompanied with Mr. *Ant. Balam* and Mr. *Joſ. Verney*) there is a Stone about 66 *Foot* long on the North-ſide of the *Caſtle-Wall*, and two more of 60 each: And I believe we ſaw the Way they travelled, having left one of their Company, tho' not quite ſo big, in the Road, as a Monument thereof to this very Day.

Explanation of the Figures; *Ib.* p. 627. & n. 178. p. 1252.

The Draught of one of theſe *Obeliſks* was very well taken by Monſieur *Brute*, a *French Druggerman*: But that of the other, by a *Dutch Painter*, is not ſo well.

Fig. 74.

Fig. 74, repreſents the *Obeliſks*, or *Aiguille*, near the *Matarea*: The Height of this *Pillar* is 67 *Foot*; the Bigneſs $7\frac{1}{3}$ with the *Hieroglyphick Character*. *o o*, ſhews the Height of the *Nile*'s riſing above the Superficies of the Earth when it *overflows*.

Fig. 75.

Fig. 75, repreſents the *Needle* at *Alexandria*.

Some unknown antient Characters; *by Mr.* Flower. *n.* 203. *p.* 872. *Fig.* 76. *Vid. inf.* Cap. III.

XLV. 1. Theſe *Characters* being 22 in Number, are all that could be diſtinctly collected out of the *antient Sculptures*, to be found at this Day extant at the admired Hills of *Canary*, where there are divers *Receptacles* cut out of the main Rock, by the incredible Induſtry and Charge of the *antient Inhabitants* of thoſe Parts, ſuppoſed *Moors* or *Negroes* of *Ethiopia* rather than *Gentues*; by reaſon of the large Proportion of their uſual Statures, which is at leaſt eight Foot in Height, having great Lips, full Eyes, flat Noſe, and curled Hair.

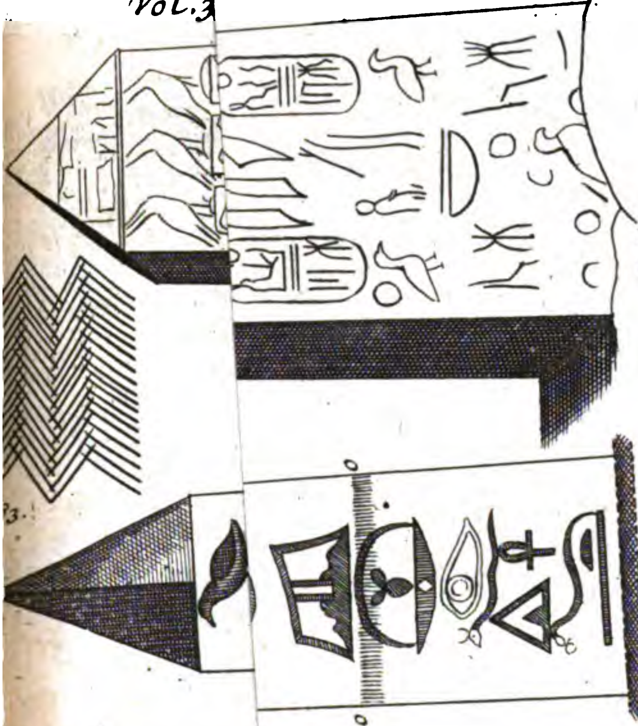
Remarks; *by Mr.* Francis Aſton. *p.* 873. *Vid. ſup.* Sect. XLII.

2. It is probable the Intent of this Paper was to compare theſe *Characters*, being very antient, with them at *Perſepolis*.

The Places here pointed at are chiefly three, *two* upon the Iſland of *Salſete*, and *one* upon the Iſland *Pory*, called the *Pagode* of *Olifant*; of ſuch a Bigneſs, that one of them is deſcribed by *Linſchoten* to be equal to a Village of 400 Houſes; to conſiſt of 4 Ranges of Building, one over another, within the Mountain; and to contain no leſs than 300 Rooms or Habitations, adorned throughout with ſtrange frightful *Statues* of *Idols*, *Lions*, *Tygers*, *Elephants*, *Amazons*, and a hundred other things very well deſigned.

Who

Vol.3



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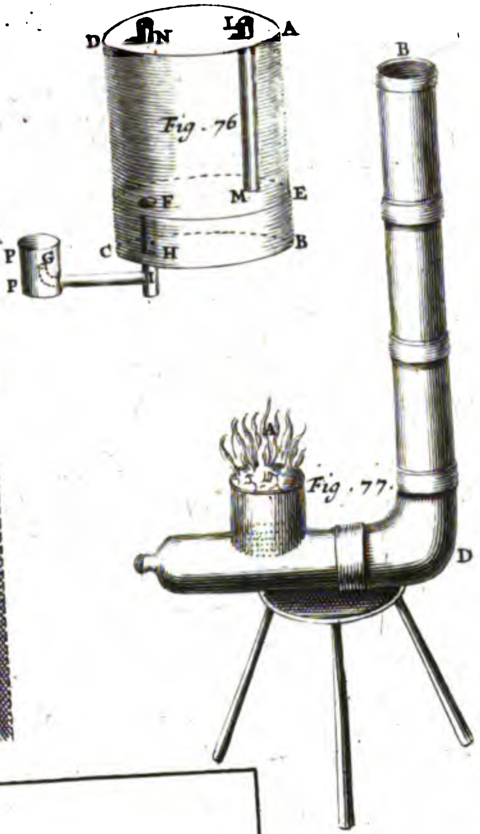
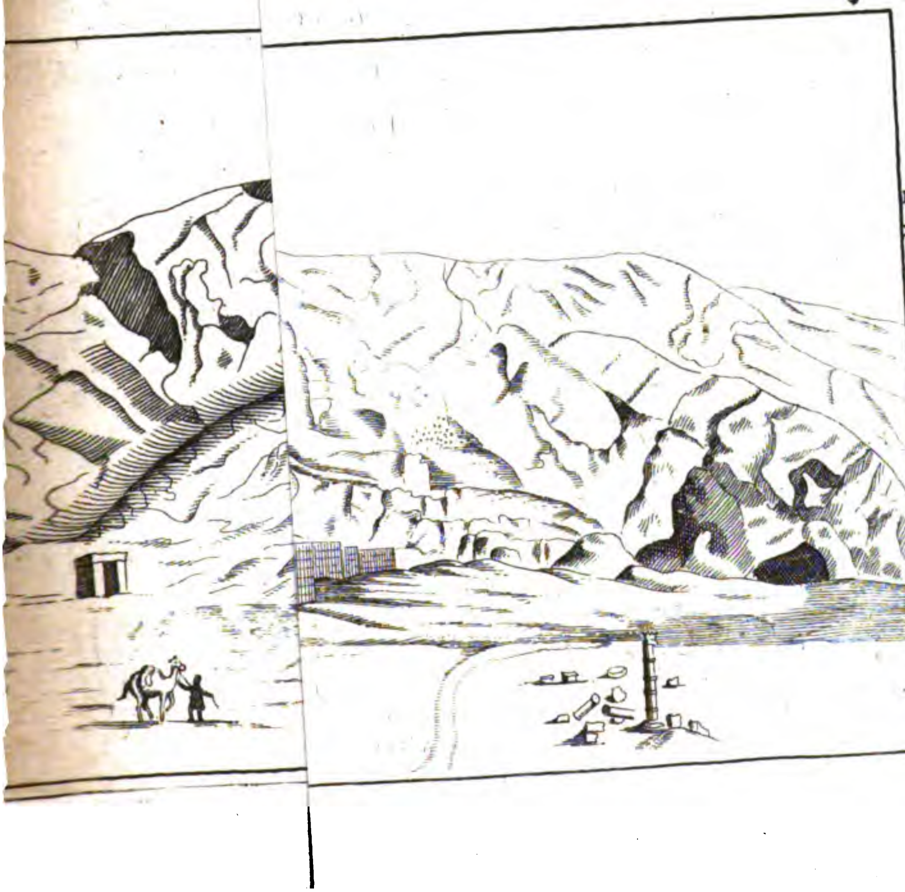


Fig. 76

Fig. 77



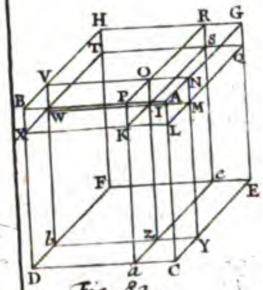
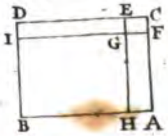


Fig. 82.

Fig. 81.



Who were the Architects is very uncertain; *Balbi* names the *Romans*, and *Alexander the Great*; others the *Chineſes*; Mr. *Flower*, the *Abaſſins*; who have ſome few Churches cut in the Rocks; but *Alvarez*, who ſaw them twice, ſays, the Country affirms they were made by *Ægyptians*, or other white Men. But though their Beginning be obſcure, their End may more eaſily be declared; for the *Portugueſes*, upon the Building of *Goa*, began to deſtroy them, and have continued to do ſo ever ſince.

XLVI. *A Paper* omitted, *viz.*

A Diſſertation of Dr. *Barrow*, De *Seſtertio*; taken out of the 4th Vol. of his Works. *n.* 190. *p.* 384.

XLVII. *Accounts of* Books, *and* Emendations, *omitted.*

1. INſtitutionum *Chronologicarum* Libri duo; una cum totidem *Arithmetices Chronologicæ* Libellis: per *Gulielm. Beveregium*, S. Th. D. *Lond.* 1669, in 4to. *n.* 47. *p.* 956.

2. *Ægidii Strauchii* Breviarium *Chronologicum. Witebergæ*, in 12mo. *n.* 50. *p.* 1022.

3. Abregé *Chronologique* de *l'Hiſtoire Sacre & Profane*, par le P. *L'Abbé* S. J. in 5 Vols. *Paris*, in 12mo. *Ib. p.* 1022.

4. Tabula *Mathematico-Hiſtorica*; *à* Cl. *Megerlino*, Matheſeos Prof. *Baſil.* *n.* 127. *p.* 667.

5. Nouvelle *Science de Temps*; ou Moyen General de concilier les *Chronologues*; par le S. *Meynard*, Seigneur d' *Iſerné*. A *Paris*, in 12mo. *n.* 131. *p.* 793.

6. *Palæologia Chronica*: A Chronological Account of antient Time; in 3 Parts; *Didactical*, *Apodeictical*, *Chronical*; by *Rob. Cary*, D. LL. *Lond.* 1677, in Fol. *n.* 132. *p.* 808.

7. *J. Walliſii*, S. T. D. Exercitatio de *Periodo Juliana*. *Lond.* 1678. *n.* 139. *p.* 980.

8. Quæſtio Triplex de *Anno*, *Menſe*, & *Die*, *Chriſti Nati*, *Baptizati* & *Mortui*. Auth. R. P. *Michaele Seneſchallo*, è S. J. *Leodii*, 1670, in 4to. *n.* 60. *p.* 1085.

9. *Julius Celſus* de Vita & Rebus Geſtis *Julii Cæſaris*: Ex Muſeo *Joan. Georgii Grevii*. Iterata Editio. 1697. *n.* 222. *p.* 327.

10. The Primitive Origination of Mankind, conſidered and examined according to the Light of Nature; by Sir *Matth. Hale*. *Lond.* 1677, in *Fol.* *n.* 136. *p.* 917.

11. A Letter of *L'Abbé de la Charmoye* to *L'Abbé Nicaiſe*, concerning the Original of Nations. Some Remarks on it; by M. *Leibnitz* and Dr. *Wallis*. *n.* 255. *p.* 274. *p.* 273. 283.

12. *Olai Rudbekii Atlantica*, ſive *Manheim* veri *Japeti* Poſterorum Sedes, ac Patria: ex qua non tantum Monarchæ & Reges, ad totum fere Orbem reliquum Regendum ac Domandum, Stirpeſque ſuas in eo Condendas, ſed etiam *Scythæ*, *Barbari*, *Aſæ*, *Gigantes*, *Gothi*, *Phryges*, *Trojani*, *Amazones*, *Thraces*, *Libyes*, *Mauri*, *Tuſci*, *Galli*, *Cimbri*, *Cimmerii*, *Saxones*, *Germani*, *Suevi*, *Longobardi*, *Vandali*, *Heruli*, *Gepidæ*, *Teutones*, *Angli*, *Pictones*, *Dani*, *Sicambri*, aliique Virtute Clari & Celebres Populi, olim Exierunt. *Upſal.* *Phil. Col. n.* 4. *p.* 118. *n.* 255. *p.* 283.

n.62.p.2032. 13. De *Anglorum* Gentis *Origine*, Diſceptatio; Auth. *Rob. Sheringhamo. Cantab.* 1670, in 8vo.

n.124.p.596. 14. *Britannia Antiqua* Illuſtrata: Or, The Antiquities of antient *Britain*, derived from the *Phœnicians*, &c. *Vol.* I. By *Aylet Sammes. Lond.* 1676.

n.209.p.115. 15. The Hiſtory of the Church of *Malabar*, from the Time of its being diſcovered by the *Portugueſe* in the Year 1501. Giving an Account of the Perſecutions and violent Methods of the *Roman* Prelates to reduce them to the Subjection of the Church of *Rome*; together with the Synod of *Diamper*, celebrated *Ann.* 1599. With ſome Remarks upon the Faith and Doctrine of the Chriſtians of St. *Thomas* in the *Indies*, agreeing with the Church of *England*, in Oppoſition to that of *Rome*. Done out of *Portugueſe* into *Engliſh*; by *Mich. Geddes*, Chancellor of the Cathedral Church of *Sarum. Lond.* 1694, in 8vo.

n.213.p.358. 16. The Antiquities of *Palmyra*, alias *Tadmor*; built by King *Solomon* in the Deſert of *Arabia:* Containing the Hiſtory of that City, and its Emperors, from its Foundation to this preſent Time; by *Ab. Seller*, in 8vo.

n.153.p.386. 17. *Recherches Curieuſes*, &c. Curious Reſearches of Antiquity, contained in divers Diſſertations concerning Medals, Baſe-Reliefs, Statues, *Moſaick* Works, and Inſcriptions of the Antients; by Dr. *Spon*, 1683, in 4to.

n.260.p.467. 18. Linguarum *Vett. Septentrionalium* Theſaurus *Grammatico-Criticus* & *Archæologicus*. Accedit Catalogus Librorum *Veterum Septentrionalium*, tam eorum qui excuſi ſunt, quàm qui in *Membranis Scriptis* nondum eduntur, quàm fieri licuit, Locupletiſſimus. Auth. *G. Hicks*, S. Th. D. *Oxon.* in Fol.

n.198.p.688. 19. A Treatiſe of the *Roman* Ports and Forts in *Kent*; by *W. Somner*, &c. To which is prefixed the Life of Mr. *Somner. Oxon.* 1693, in 8vo.

n.220.p.259. 20. Parochial Antiquities, attempted in the Hiſtory of *Ambroſden*, *Burceſter*, and other adjacent Parts, in the Counties of *Oxford* and *Bucks*; by *White Kennet. Oxon.* 1695, in 4to.

n.228.p.538. 21. A Book of Old *Roman* and *Etruſcan* Sepulchres lately found; by *Petro Sancto Bartoli.*

n.166.p.825. 22. Specimen Univerſæ *Rei Nummariæ Antiquæ:* Or, An Eſſay towards an Univerſal Hiſtory of antient Coins and Medals; by *Andreas Morellius. Paris*, 1683, in 8vo.

n.236.p.57. 23. *Numiſmata*, A Diſcourſe of Medals, Antient and Modern; together
with ſome Account of Heads and Effigies of illuſtrious and famous Perſons,
in Sculps, *&c.* To which is added a Digreſſion concerning Phyſiognomy,
by *T. Evelin*, Eſq; *Lond.* 1697, in Fol. *Some* Errata *of the* Preſs *are*
n.240.p.204. *here* corrected.

n.177.p.1242 24. *Edvardus Bernardus*, de *Menſuris* & *Ponderibus* κατ' ἐπιτομήν. *Oxon.* 1685.

n.179.p.33. 25. An Eſſay towards the Recovery of the *Jewiſh* Weights and Meaſures, comprehending their Money, by the Help of antient Standards, compared with ours of *England*; by *Rich. Cumberland*, D.D. *Lond.* 1686, in 8vo.

CHAP.

CHAP. III.

Voyages and Travels.

I. THAT Part of the County of *Lincoln* that lieth towards the Sea, is a *Level* about 50 Miles long, *viz.* from *Grimſby* to *Crowland*; and broad from the Sea to the Woulds (or High-lands) 10. It may be divided firſt into Marſhes, extending from *Grimſby* to about *Wainfleet*, in which are a great Stock of large Sheep, which yield a very luſty Wool, or of a large Staple (as here phraſed) 3 or 4 Fleeces uſually making a Tod of 28 Pounds. Several hundred Loads are yearly carried out of it into *Norfolk*, *Suffolk*, the North and Weſt Countries, in great Packs (called *Pockets*) of about 2500 *lb.* Weight, and there manufactured.

Several Obſervables in Lincolnſhire; *by Mr.* Chr. Merret. *n.* 223. *p.* 343.

2. *Fens*, the Eaſt begins about *Wainfleet*, and ends at *Sibſye*, yielding a great Plenty and Variety of Fowl and Fiſh, particularly Duck, Mallard, and Teal, which are uſually taken in Decoys, and ſent to *London*. The Decoy Men contract for them all at a certain Rate *per* Dozen, which the Carriers (*Kedgers*) are obliged to take off their Hand: Two Teal are reckoned equal to a Duck, which uſually coſt here about 9 Shillings a Dozen. About *Midſummer* (when moultering Time is) ſeveral Perſons, ſome for Pleaſure, others for Profit, go in ſmall Boats among the Reeds, and with long Poles knock them down, they not being able to ſwim or fly from them. A little before *Michaelmas*, great Flights arrive in theſe Parts, which ſoon grow fat. When the Decoys are frozen (which they keep open as long as poſſible, by breaking them) the Fowl reſort to the Sea for their Food. As for Fiſh, there are great Quantities, eſpecially Pike, ſome being of a very large Size. The Fens abound no leſs with *Quadrupeds*, as Beaſts, Sheep eſpecially (which will grow fat) and Horſes. Theſe Fens are common, ſo that each Town hath a diſtinct Brand, and alſo each Man: There are ſeveral Fen-Riders, which look after them. The Cattle, when uſed ſome ſmall time in a Piece of Ground, ſeldom leave it; ſo that each individual Perſon may eaſily find his own Goods in ſuch a large Tract. Through theſe Fens run great Cuts or Drains, in which are a great many Fiſh. There are alſo vaſt Numbers of Geeſe, which live on the Graſs, but both taſte rank and muddy; but they yield vaſt Quantities of Feathers and Quills, there having been 300 Baggs, each weighing one Hundred and an Half, exported from *Boſton* in one Year. The Owners pull them 4, 5, nay, ſome 6 times a Year for their Feathers, and thrice for their Quills; each Pulling comes to 2 Pence. Some Perſons have 1000, and ſome more; they are kept at little or no Charge, except in deep ſnowy Weather, when they feed them with Corn. Between *Spalding* and *Crowland* grow very great Crops of Oats, and alſo large Quantities of *Rapum Sylv.* (call'd *Cole-Seed*) whereof they make Oil, by breaking it between two great black Marble

Stones of near a Tun Weight, one ſtanding perpendicularly on the other (they come out of *Germany*) in Mills, called Oil-Mills; ſome go with Sails, and ſerve alſo to drain the Fens, and are called Engines, being of good Uſe, and diſcharge great Quantities of Water.

Theſe Fens lying low, being of great Extent, and receiving vaſt Quantities of Water from the High Country, makes them ſubject to overflowing; and although there be great Coſt and Skill uſed to keep them dry, yet they are ſometimes like a Sea: Sheep have been brought out in Boats, and the Inhabitants ſupplied in their upper Rooms with Proviſions by them. To drain them there are great Cuts of 20, 30, and 40 Foot wide running through them; moſt of them made by a Body of Men called Undertakers. They alſo made very large Sluices; but the Country has ſince dammed up their Sluices, and built new ones (called Goats and Clows). Some coſt near 2000 *l.* And although made with great Skill and Strength, yet are they ſubject to be blown up by the vaſt Quantities and Force of Water that lieth upon them (eſpecially when overflown). Some have two or more Pair of Doors, of 6, 8, or 10 Foot high, which ſhut when the Water in the River is higher than in the Drains; and, *è contra*, running ſometimes a Body of 8 Foot ſquare, for about 6 or 7 Hours, during the Ebb.

3. *Paſture-Grounds* lying between the Sea and theſe Fens; they are very fertile, feeding a great Number of fat Oxen and Sheep, which weekly are ſent to *London* in Droves. Their Wool, both as to Plenty and Goodneſs, much like to that of the Marſhes. Tallow here is in good Plenty, which ſupplieth *London* and other Places. Here each Town hath an Out-fall by Drains, and Goats to keep them dry.

Near unto the Fens ſtands *Boſton*, now not ſo remarkable for Trade; but for the Church, Steeple and River may compare (probably) with any private Pariſh in *England*. The Church looks like a beautiful Princeſs among a Company of fair Ladies, no County yielding fairer Churches; and what is more obſervable, not a Stone fit for Building in all this Tract. The Church is very lofty; and cieled with *Iriſh* Oak, neatly wrought; the Body is 100 Foot wide. The Steeple is a Tower of 285 Foot high, Octangular towards the Top, of curious Stone carved Work, ſtanding not above 12 Yards from the River *Witham*; 'tis but 32 Foot wide, and but 40 long. At each Angle is a large Butteress; the Stones of the Sides between them are but 7 Inches thick; ſo that this ſtately curious Building ſeems to be ſupported by them: It much reſembles St. *Mary*'s at *Antwerp* (only wanting the hollow Crown-work and Weather-cock on the Top of all) of which the Inhabitants report *Charles* V. the Emperor, ſhould ſay, That it ought to have a Caſe, and only be ſhewn on Holydays. Records mention the Foundation to be laid 9 Foot below the Bottom of the River. The Length of the Church is equal to the Steeple's Height. The Pillars (which are very neat and ſmall for their Height) Windows and Stairs are equal to the Months, Weeks and Days in a Year. From the Top of it *Lincoln* and *Lyn* may be ſeen; as alſo Ships ſailing in the Seas at a great Diſtance: 'Tis a great Land-Mark, and may be ſeen above 40 Miles at Sea. The River is remarkable for good Pike, according to the old Rhime,

An Ankham *Eel, and a* Witham *Pike,*
All England *cannot ſhew the like.*

As alſo for the Rapidneſs of its Stream; of late there are Eagers, ſometimes endangering Shipping, without great Care, which much deſtroy its Banks and Keys, though fortified with great Piles and *Jetties*, &c. ſo that neither Town nor Country can ſcarcely keep it within its Banks, it often breaking and over-topping them, which in time is like to ruin the Town, except aſſiſted by Parliament, or by taking in of the Fen, which might make it flouriſh again, it being as rich in Soil as any Ground probably in *England*. But what is moſt remarkable, ſome Years 40, 50, or 100 Tun of Oil hath been made of a ſmall Fiſh, called in Latin *Pungitius*, here Stickleback, elſewhere Prickling or Baneſtead, having ſmall Prickles on its Back, whence moſt of its Names, thereby ſcaring the Fiſh out of our River, eſpecially Smelts, of which we have good Plenty and large. They are not above an Inch and Half long, and about half as broad, taken in this River above the Town, for about five or ſix Miles: About a Buſhel are taken at a Draught, and about 8 Chalder will make a Hogſhead. They boil by Night what were taken by Day, elſe the Oil will run of itſelf, and to waſte.

The Sea loſeth and gaineth conſiderably in this County; for about *Holebach*, *Sutton*, and *Wainfleet*, great Marſhes have been lately taken in; but Northward of *Ingold Meals*, it hath loſt much more. I have ſeen the Roots of Trees that have been dug out of the Sands at low Water near a Mile from the Shore, which I take to belong to Fir, the Bark ſmelling aromatically, and ſomewhat like that of Fir-Timber in Piles that have been long in ſalt Water, but not near ſo ſtrong; and at *Mawplethorp* they are often in Danger of being drowned, their Defence being only Banks, or Hills of a ſmall Sand, called Meals, the former Church having been devoured by it.

What is further obſervable among Animals, is firſt of Quadrupeds: The Country-People gather up the Dung of Oxen and Cows, which they temper with Water, and ſpread it on the Ground about five Inches thick, and cut it out in oblong Pieces of about a Foot, and call them Dithes, which they uſe for Fewel. I have been credibly informed, that one Perſon's Inventory of them came to 400 *l.* They alſo gather up Hog's Dung, and ſteep it in Water, and having well ſtirred it, ſtrain it, and ſo uſe it to waſh Cloaths, which when bleached in the Summer, will become white and ſweet.

Beſides Fowl mentioned by Mr. *Camden*, of Mud-Suckers (which are eſteemed the beſt) we have Ruff and Reve, the former being the Cock, the other the Hen; in *Latin*, *Aves Pugnaces*, becauſe you ſhall ſeldom look on them but they are fighting: Among 100, rarely two are of a Colour;

they are uſually *mewed*; they are ſcarce and dear, uſually beſpoke by Perſons of Quality. Here are alſo, almoſt through the whole Level, Swans in their Drains, which they often feed for Preſents with Oats, each requiring two Strike, *i. e.* 16 Gallons, here reputed but a Buſhel.

For Fiſh, here are Turbets in good Plenty (here called Brets) taken in Nets trailed on the Ground by two Horſes; one goeth Mid-Rib deep into the Sea, the other near the Shore. Here are alſo good Plenty of large Soals taken in Troul-Nets, the Smacks being under Sail trailing them along; as alſo good Store of Scate, which are taken by Hooks lying near the Shores; as are alſo Cod and Thornback.

Amongſt Inſects, Gnats, here Midges, are in ſome Places very troubleſome; ſome have Nets made of Silk to ſecure them from being bitten. Frogs here are in great Plenty, called *Holland Waites*.

As for Vegetables, great Quantities of Hemp are ſown in ſeveral Places, of which Ropes are made both for Sea and Land; the Female is called Femble, as alſo Flax: The Seed is broken, and Oil made thereof, as of Cole-Seed. Our Salt-Marſhes yield a great deal of *Kali Geniculatum*, which, when pickled, is their Samphire, and very plentifully uſed, and far eſteemed by them before *Crithmum Marinum*. *Carum* grows plentifully in our Paſtures; the Seed they call Saxifrage, which they gather and ſend to *London*. *Myrtus Brabantica*, called *Gall*, is uſed in ſome Places to garniſh their Chimneys: *Kirton* Pippins are here good, and in very good Plenty. More rare Plants are *Rhamnus Salicis Fol. Fructu Flaveſcente* C. B. *Limonium*, *Scordium*, *Petaſites*, *Lilium Conval. Eryngium*, *Althæa*, in great Plenty; *Sambucus vulg. Baccis in Umbellis*, *Militaris Aizoides*.

Theſe Parts afford but little Variety of Metals, Gums, or Stones. Amber is pick'd up ſometimes on the Sands in pretty big Pieces; I have had one weighing near ſix Ounces. The *Aſtroites*, found at *Belvoir-Caſtle*, will not only *ſtir* in Vinegar, but alſo *dulcify* it: The like will thoſe do, as alſo *Lapis Judaicus*, firſt found in *England* by my Kinſman, Mr. *Robert Jenner*, Rector of *Lyddiard-Milliſcent*, *Wilts*, in a Park belonging to Sir *Walter St. John*, near unto him.

Here Coals are charred, and then called Coak, wherewith they dry Malt, giving little Colour or Taſte to the Drink made therewith. On the Sands the poor People ſweep together a black ſmall Subſtance (I ſuppoſe it is Coals broken) wherewith they make Fires, by leaving open a Hole in their Chimneys for the Air to blow it; they have one on each Side to open and ſhut as the Wind ſits.

What I have further to obſerve is, that Agues (here called *Holland Baylies*) are very rife; few Strangers eſcaping without a ſeaſoning. As alſo, that at *Spalding* there is lately a vaſt Tunnel laid under the River *Welland*, carrying another under it, for draining the Fens. And, that between *Dunnington* and *Brigg-End*, which is about three *Miles*, a good Cauſeway is carried through the Fen, having, in ſeveral Places, Bridges for the Water to run under them, whence the Name of *Brigg-End Cauſeway*: It is after great Rains under Water, and Paſſengers take Guides, the Bridges directing them. It was built at the Country's Charge, who alſo purchaſed near 100 *Pounds per Annum* to maintain it; now under the Care of the Family of the *Shuttlewoods*. It is farther obſervable, that there are a great many Hills thrown up called *Barrows*, mentioned by Sir *Tho. Brown* in his *Miſcellaneous Tracts*, ſuppoſed to be *ſepulchral Monuments*.

Some Years great Quantities of *Acus Major* come into our Haven; and they ſay the freſh Water blinds them, and that they portend hard Winters. They run their *Beaks* into our *ouſy Shore*, where the *Tide* leaves them, and ſo are taken up in great Quantities: They are ſaid to eat like *Mackarel*; the Palate is ruled by the Eye; they looking like them. Our *Fen Geeſe*, when taken up and fed with Corn, become as good as others. After preſſing out the *Oil* from the *Cole-Seed*, the Remainder is called *Cakes*, which here they heat *Ovens* with, and burn for Fuel (but ſome ſmell ſtrong) We export them to *Holland*, where they feed their *Kine* with them.

Obſervations at Cheſter: *by Mr.* Edm. Halley. *n.* 222. p. 318.

II. The *Stone* at *Cheſter*, which is ſoft reddiſh Girt, and very friable, with ſhining Particles intermixed, is very apt to decay with the Weather; ſo that all old Buildings are very much defaced thereby, and the *Walls* which are built thereof are ſo frequently out of Repair, that they have Officers on purpoſe, whom they call *Murengers*, who do gradually refit them where they are moſt worn out. In ſome Places the *Stone* is in a manner mouldered away like *Sammel Bricks* in a Wall, leaving the *Morter* ſtanding. In theſe *Stones*, and the *Quarries* from whence they came, I have diligently ſought for *Shells*, or other *animal Subſtances*, ſuch as are often found in other Places, but hitherto have found no ſuch things: But the *Stone* is generally interſperſed with *Pebbles* and ſmall *Flints*, which, as the *Stone* decays, do diſcover themſelves with it, as if they had been lodged in the *Sand*, whereof the *Stone* conſiſts, before its *Induration*.

An Account of Snowdown-Hill; *by Mr.* Edmun Halley. *n.* 229. p. 566.

III. From the Top of *Snowdown-Hill* the Sea dipped every-where above a *Degree* below us, the *viſible Horizon* being a *leſſer Circle*. We ſaw *Ireland* plainly from the W. by S. to S. W. by W. and then appearing in the N. N. W. and the Mountains of *Cumberland* or *Weſtmorland* very faintly, but evidently in the *North*; and I think we ſaw as far as *St. David*'s *Head* into the *South*; *Carnarvonſhire* and *Angleſey* lay under like a *Map*, affording a very pleaſant Proſpect, were it not for the Horrors of the neighbouring *Precipices*. Hence we counted 15 or 16 *Lakes*, great and ſmall, where the Cavities of the Rocks are filled up with the *Rills* that gleet from the Hills: All theſe are ſaid to abound with *Trouts*, ſome of which we found to be ſpecial good Fiſh. And in one of theſe *Lakes* I was on board a *floating Iſland*, as it may be called: The *Lake* is ſcarce *half* a *Mile* about, environed with a boggy turfy Soil, a Piece of which, about 6 *Yards* long and 1 broad, floats on the Water, being about 5 or 6 *Inches* raiſed above it; but it is, I believe, about 18 *Inches* deep within the Water, having broad ſpreading fungous Roots on its Sides, the Lightneſs of which *buoys* it up. It was driven on the *Lee-Shore:* But I launched it off and ſwam it, to be ſatisfied it *floated.* This I take the more Notice of, becauſe it is denied to be true, by the Author of the *Additions* to *Camden*, lately publiſhed; but I myſelf ſaw it as deſcribed, and was told it had formerly been bigger; there being a leſſer Spot, that they told us, had been heretofore a Part thereof, which *floated* likewiſe.

A little above *Llanberris*, which ſtands at the *Foot* of the Hill, are the principal *Fountains* of the River that falls into the *Chanel* of *Angleſey*, at *Carnarvon*, called antiently *Segontium.*

Obſervations in Scotland; *by Mr.* Ja. Fraſer. *n.* 254. *p.* 231.

IV. Upon the North-ſide of *Loch-Neſs* in *Stotland*, ſtands the famous *Caſtle* of *Urquhart* upon a Rock: The great *Ditch* round it was, for the moſt part, cut out of the Rock, and received the Water of the *Lake.* This *Caſtle* conſiſted of ſeven great Towers, and it is ſaid, was built by the *Cummins*; but had its Overthrow by King *Edward* I. of *England:* And nothing remains now but one Tower to the *Eaſt.*

There is, due *Weſt* from the End of the River of *Neſs*, an Arm of the Sea called *Beaulit Frith*, 6 *Miles* in Length, and 2 in Breadth. This Bottom ſure has been *firm Land* of old; for near the Middle of it we find long *Oaken Trees* with their whole *Roots*, ſome above 60 in Length, lying covered with Sand, which, no doubt, have grown there, and lie flat as they fell. For further Information, there are three great *Heaps* of *Stones* in this *Lake*, at conſiderable Diſtance one from the other: Theſe we call *Cairns* in the *Iriſh.* One of a huge Bigneſs (in the Middle of the *Frith*) at Low-Water, is acceſſible: And we find it has been a Burial-place, by the Urns which are ſometimes diſcovered. As the Sea encroaches, and wears the Banks upward, there are long *Oaken Beams* of 20 or 30 *Foot* long found: Some of theſe 8, ſome 12, or 14 *Feet* under Ground. I ſaw one of them 14 *Foot* long, that carried the Mark of the *Ax* on it, and had ſeveral *Wimble-bores* in it. The *River* of *Beuly*, which falls into this Arm of the Sea near *Lovat*, hath ſo ſunk, that *Oaken Trees* of incredible Length, and 16 *Foot* under Ground, are diſcovered in the *Banks*, with Degrees of *Sand*, *Gravel*, *Clay*, and *Earth* above them: And if you remember, when we went to *Bewly*, we found ſome *Oaks*, with *Coals* and Pieces of *burnt Timber* as low as 16 *Foot*, or thereabouts.

On the Top of a Mountain, called *Scure-in-Lappich*, there is a vaſt *Heap* of *white Stones* like *Cryſtal*, each of them bigger than a Man can heave: They will ſtrike Fire like a *Flint*, and have the Smell of *Sea-wrack.* Upon this Mountain are found alſo *Oyſter-Shells* in Plenty, *Scallop* and *Limpet-Shells*, yet 20 *Miles* from any Sea. Round about this Hill grows the *Sea-pink*, in *Iriſh*, *Teartag:* It has the Taſte and Colour of that which grows on our *Sea-Banks.*

The *Pagan Temples*, or High-Places of *Idolatry*, are ſtill very numerous here: Upon the River-ſide of *Narden*, I reckoned 13 in 2 *Miles.* They are *Orbicular* round, and at the *Weſt-End* two high Stones like *Pyramids.*

There is an outward and inward Circle of leſſer Stones, and a round *Mote* in the *Centre* for *Sacrifice*. Another Sort of them are only of *Earth*, and a *Trench* round about, and a *Mote* in the *Middle*. In many of theſe I find a round *Heap* of *Stones*, and *Urns* in them: It ſeems a different *Religion* afterwards turned theſe *Places* of *Worſhip* into *Burial-places*.

Obſervations in Scotland; *by Sir* Geo. Mackenzy. *n.* 117. *p.* 396.

V. In *Scotland*, one of the moſt ordinary *Soils* for *Barley-land*, is an Earth digged and mixed with *Beaſts Dung*: In a Place near my Dwelling there is a Plat of Ground, leſs than an *Acre*, out of which, for theſe many Years paſt, Earth hath been digged for the ſaid Uſe; and in *two Years* Time it will *grow* up again, and fill the excavated Place; ſo that it continually furniſhes *Soil* for the adjacent Lands. Another I have, in a Farm belonging to myſelf, twenty *Miles* diſtant from this, of the ſame Nature and Quality. Both are a ſtiff clayiſh Earth, of a dark Colour and moiſt: It will grow a *Foot* high in two *Years*. Nothing makes our Land give better Increaſe of *Barley* than *Sea-wrack* (*Alga Marina*): But Lands often uſed to this *Manure*, yield but bad *Oats*, and a ſmall Quantity; and the Husks both of *Barley* and *Oats*, that grow on ſuch Lands, are thicker than thoſe that grow on other Lands; and theſe Grains have alſo greater Mixture of *Darnel*.

The Increaſe that ſome Places in our *Iſles* do yield is almoſt incredible, conſidering the *Climate* and *Soil*. For ſome will ordinarily yield *ſixteen* or *eighteen Fold*; as very honeſt and credible Farmers have often informed me, from their continual Experience: And moſt of thoſe Lands that yield ſo well, are of a very *ſandy Soil*, and only *manured* with *Sea-wrack*. I have a Piece of Land in *Lothbroom* Pariſh, that yields every Year plentiful Crops of *Barley*, without ever having ſo much as one Load of *Manure*, or any kind of *Addition* laid on it: And this it hath done paſt Memory. I have ſeen Corn of it ſeveral Years; nor doth the Ground grow *leſs*, nor is it *exhauſted*, by yielding ſuch Plenty of Corn and Straw, though it receives no *Addition*.

There are alſo ſome Fields that appear to be nothing elſe but a Gathering of ſmall *Pebbles*, inſomuch that Earth cannot well be diſcerned amongſt them; yet do they yield abundance of good Corn, eſpecially of *Barley*; and more than contiguous Lands that are not *ſtony*.

As for our *Herbs*, I have nothing extraordinary; all I find here are in *Hiſtory*, excepting one, which grows on *ſtony Shores*. When the *Highlanders* want *Ink*, they take the *Root* of the *Iris Paluſtris Lutea* (*Yellow Water Flower-de-luce*), and infuſe it 24 *Hours* in clear Fountain-water; others boil it a little: The Water will not be tinged to any Height. Then they take a rough white *Pebble*, and rub it continually in the Water on a Knife, or any Piece of clean *Steel*; and in leſs than an *Hour*'s Time, the Water will become very *Black*, and tolerable good *Ink*.

Our *Foreſters* allege, that when *Deer* are wounded, they lie on a certain Herb, which grows plentifully in our *Foreſts*; and that by its Virtue the *Bleeding* is ſtanched, and the Wound healed. I did take a Quantity of it, and reduced it to a *Salve*, with Wax and Butter: Its Effect was, that it *healed* too *ſuddenly*. So that I durſt not adventure to uſe it in any deep Wound; but for ſuperficial Scars, it hath a very ſudden Operation. I find this *Herb* to be *Aſphodelus Lancaſtriæ Verus* of *Johnſton*, or the *Lancaſhire Aſphodel*.

I cannot omit to add here, that it is very ordinary to find *Molucca Beans* on the Shore of the *Lewes*, or other our *Weſtern Iſles*. They are found faſt to the *Stalks*, which the common People ſuppoſed to be *Sea-Tangles*, and laughed at me, when I ſaid they were *Land-Beans*: Which made me write to the Earl of *Seaforth*, whilſt he lived in the *Lewes*, that I ſuppoſed theſe apparent *Tangles* were the *Ham* of the *Beans*, which, by long lying in the Sea, might acquire that Likeneſs: His Lordſhip examined the Matter, and found it ſo. And he likewiſe ſent to me a Piece of a *Cabbage-Tree* that was found on that Shore. It is obſervable, that the *Kernel* of theſe *Nuts* will be *freſh* and *ſound*: And the People make *Boxes* for *Snuff* of the *Bean-Husk*. Now, conſidering the Situation of theſe *Iſles*, with reſpect to any Place where the *Molucca-Beans* grow, let the Obſervers of *Tides* conſider what Reciprocations muſt be imagined to adjuſt the *Eaſtern* and *Weſtern conſtant Currents* of the Main, with the Wafting of theſe *Beans* on Places that lie ſo far out of the *Road* of any of the *direct Tides*. And if they grow only about the *Molucca Iſles*, or on no Place on this Side the *Equator*, it would ſeem more probable, that they came by the *Northern Paſſage* than any other Way. And their *Freſhneſs* in the *Kernel* ſeems rather to have been kept in a cold Conſervatory, than in the warm Baths of the other Progreſs.

Strange Beans *frequently caſt Aſhore on the* Orkneys; *by Dr.* H. Sloan. *n.*222.*p.*298.

VI. I have ſeveral times heard of *ſtrange Beans* thrown up by the Sea on the *Iſlands* on the *North-Weſt* Parts of *Scotland*; eſpecially thoſe of them which are moſt expoſed to the Waves of the *great Ocean*: They are thrown up pretty frequently in great Numbers, and are no otherwiſe regarded than as they ſerve to make *Snuff-Boxes*. Dr. *Geo. Garden* hath lately ſent me four *Sorts* of them, very freſh, and little injured by the Sea.

The *firſt* is what is called, at *Jamaica*, commonly, *Cocoons*; by me, *Phaſeolus Maximus Perennis*, Folio Decompoſito Lobo Maximo Contorto. It grows in both the hot *Eaſt* and *Weſt-Indies*. This, I am told, is alſo caſt up on the Coaſt of *Kerry*, in *Ireland*.

The *ſecond Sort* is what, in *Jamaica*, we call commonly the *Horſe-Eye-Bean*, from its Reſemblance to the Eye of that Beaſt, by means of a *Hilus*, or *Welt*, almoſt ſurrounding it. This likewiſe is common to the hot Parts of the *Eaſt* and *Weſt-Indies*.

The *third Kind* is that which, in *Jamaica*, is called *Aſh-coloured Nickar*, from its being perfectly round, and very like a *Nickar*, ſuch as Boys uſe to play withal. This is likewiſe common to the hot Parts of the *Eaſt* and *Weſt-Indies*.

The *fourth Sort* of theſe *Beans* I never ſaw grow; but I have ſeen ſeveral of them in *Collections* of *rare Fruits*. It is the *Fructus Exot. Orbicularis*

Sulcis Nerviſque diſtinctus 4, *ſeu Fructus alter Splendens* 4. *Sulcis diſtinctus:* C. B. Where it grows Authors are ſilent.

It is eaſy to conceive, that the *Beans* growing in *Jamaica* in the Woods, may fall from the Trees into the *Rivers*, and be conveyed by them into the Sea: It is likewiſe eaſy to believe, that being got to Sea, and floating in it in the Neighbourhood of that *Iſland*, they may be carried from thence by the *Wind* and *Current*, which is there conſtantly *Eaſt*, and which, meeting with a Stop on the main Continent of *America*, is forced through the *Gulph* of *Florida*, or *Canal* of *Bahama*, into the *Northern American Sea*; for the *Lenticula Marina Serratis Foliis, Lob*, or *Sargaſſo*, grows on the Rocks about *Jamaica*, and is carried by the *Winds* and *Current* (which for the moſt part go impetuouſly the ſame Way) towards the Coaſt of *Florida*, and thence into the *Northern American Ocean*, where it lies very thick on the Surface of the Seas. But how they ſhould come the reſt of their *Voyage* I cannot tell, unleſs it be thought reaſonable, that theſe *Beans* being brought *North*, by the *Current* from the *Gulph* of *Florida*, are put into the *Weſterly Winds* Way, which generally blow at leaſt *two* Parts of *three* of the *whole Year*, and may be ſuppoſed by this means at leaſt to arrive at *Scotland*.

By the ſame means that theſe *Beans* come to *Scotland*, it is reaſonable to believe that the *Winds* and *Currents* brought from *America* thoſe ſeveral Things towards the *Azores* and *Porto Santo*, which are recorded by *Fernan. Colon*, in the Life of his Father *Chriſtopher*, to be ſome of the Reaſons that moved the ſaid *Chr. Columbus* to attempt the Diſcovery of the *Weſt-Indies*.

Cap. 9.

VII. *Hirta* lies from *Snod*, in *Skye Iſland*, W. by N. From the neareſt Land to it in the *Hereiſch* (from whence People ordinarily take Boat) it lies due *Weſt*; and is about 50 *Miles* from the neareſt Land.

A Deſcription of the Iſland Hirta; *by Sir* R. Moray. *n.* 137. *p.* 927.

There are three *Iſlands* together, *Hirta*, *Soa*, and *Burra*; but *Hirta* only is inhabited. The other *two* are excellent Paſturage for Sheep, every *Sheep* there having two *Lambs* every Year.

In *Burra* there is no *landing*, but to the Men of *Hirta* only, in regard of the Difficulty thereof; there being but about a *Foot* broad of *Landing-place*, and that only to be attempted when the Boat riſes: For their ordinary Way is, when they come near the Rock, they turn their Boat, and ſet the Side to the Shore, two Men, one at each End of the Boat, with two long Poles keeping it off, that the Waves daſh it not ſo violently againſt the Rock, when it riſes; at which Time only the Fellow, who is to land, makes his Attempt. If he miſs his *Landing-place*, he falls into the Sea, and the reſt of the People hale him Aboard; he having before a ſmall Rope faſtened about his Middle, to prevent that Danger. But when he ſafely lands (which they ſeldom miſs to do), the reſt of his Fellows land one by one; except ſo many as they leave to attend their little Boat, which ordinarily is of ſixteen Oars.

If there be any *Strangers* (as many go from the neareſt Iſlands in Summer), they muſt be tied about the Middle with a ſtrong Rope; and when the Men of *Hirta* have climbed up to the Top of the Rock (which is above

24 *Fathom* before they ſet their Foot on Graſs), they hale up the Strangers to them with the Ropes. When they have gathered as many *Eggs*, and killed as many *Fowls*, as will load their Boat, they lower all into the Boat, and the ableſt Fellow is always left behind; who having none to help him muſt throw himſelf into the Sea, and ſo recover the Boat. This *Burra* lies from *Hirta* about 6 *Miles Northward.*

Soa lies near *Hirta*, on the *South-weſt*. In this, except *Fowls*, there is only remarkable a *Creek*, where great *Seals* haunt. The People are ſo mad, that they go in their Boat, about four of them, in that narrow Paſſage, to kill theſe *Seals* with Poles, having ſcarce room for their Oars, and every-where ſeeming to cloſe up the Mouth thereof. If the Wind changeth, during their being there, it is not poſſible to ſave either Man or Boat.

There are ſeveral *Rocks* riſing out of the Sea, amongſt theſe *Iſlands*, which the People of *Hirta* call *Stacks*; ſome 10, 20, 24 *Fathoms* above Water, without any *Graſs* upon them. On the round Tops of the *Rocks* a great Number of *Fowls* breed, and in all the Cliffs. Amongſt the reſt, there is one called *Stacka Donna*, upon the Top whereof breedeth ſuch an abundance of *Fowls*, that though it ſeems inacceſſible, yet the Men of *Hirta* have ventured to go thither. After they have landed with much Difficulty, a Man having room but for one of his *Feet*, he muſt climb up 12, or 16 *Fathoms* high. Then he comes to a Place, where having but room for his Left Foot, and Left Hand, he muſt leap from thence to ſuch another Place before him; which if he hit right, the reſt of the Aſcent is eaſy; and with a ſmall Cord, which he carries with him, he hales up a Rope, whereby all the reſt come up: But if he miſſeth that Footſtep (as oftentimes they do), he falls into the Sea, and the Company takes him in by the ſmall Cord, and then he tries it again.

Hirta Iſland is two *Miles* in Length, accounted *Five-peny Land.* In it there are ten Families. The *Men* ſeldom grow old; and ſeldom was it ever known that any *Man* died in his Bed there, but was either drowned, or broke his Neck. They are ſtrong, big, and well-skinned. Their Food is only young *Fowls* and *Eggs*; their Drink *Whey* and *Water*. They are much given to keeping *Holy-days*, having a Number of little *Chapels*, where ſometimes they watch whole Nights, making merry together with their Offerings.

The moſt Service of their *Women* is to harrow their Land; which they muſt do when their *Husbands* are climbing for *Fowls* for them.

Their ordinary Way of dividing their Land, is one *Half-peny* to every Family. The *Rocks* alſo are divided, ſuch and ſuch on every *Half-peny*: And there is a kind of *Officer* left by the Maſter of the Iſland, who governs in his Abſence, and ſo regulates, that the beſt *Climbers* and worſt are mixed together, that ſo none of the Land be unlaboured; that is, that all the Shelves of the higheſt Rocks be ſearched for *Eggs*.

The Way of their *Climbing*, when they kill their *Fowls*, is thus: They go two and two with a long Rope, not made of *Hemp*, but of *Cow-Hides* ſalted, and the Thongs cut round about and platted 6 or 9 Fold. Each End of the *Rope* is tied about each one of their Middle, and he that is foremoſt goes till he comes to a ſafe Standing; the other ſtanding firm all that Time, to keep him up, in caſe his Foot ſhould have ſlipped: When the foremoſt is come to a ſafe Standing, then the other goes, either below or above him, where his Buſineſs is; and ſo they watch Time about; ſeldom any of them being loſt, when this is obſerved.

The foreſaid *Officer*, when any Couple is to be *married*, brings them to one of their *Chapels*, and adminiſters an *Oath* to them; ſo they are *married*. Their *Children*, when they come to the Age of 15 or 16, or thereabout, come with the Maſter of the *Iſle* to the *Hereiſch Iſland*, and are there *baptized*.

An ordinary Way of killing the *Fowls* in the Miſt is this: Some of theſe Fellows lie beſide the Door of the little Houſes they have in their *Iſlands*, flat upon their Backs, and open their Breaſts; which when the *Fowls* perceive, they ſit upon them, and are preſently catched, and their Necks broke. One Fellow has killed *Hundreds* of *Fowls* in one Night after this manner.

Sometimes they ſet *Gins* on the very Top of the higheſt Rocks, and make them ſtrong for great Fowls. One being ſetting of theſe *Gins*, as he was walking along, his great Toe was catched in one of them, which made him ſtumble and fall down: Yet the *Gin* being faſt and ſtrong, kept him hung with his Head downward, till thoſe that miſſed him came in the Morning, and found him ſo fallen.

Obſervations in the North Iſles *of* Scotland; *by Mr.* Martin Martin. *n.* 233. *p.* 727.

VIII. 1. All the Tribes of *Fowls* are obſerved to have their *Sentinels*; eſpecially in the Night: The *Watchfulneſs* of the *Scart* is true to a Proverb. I have known one, who by ſurpriſing the *Sentinel* catched 300 in a Night.

2. The Want of *Rain* at the uſual Time of laying *Eggs*, hinders the *Sea-Fowls* from laying for ſome time.

3. If the *April-Moon* goes far in *May*, it hinders the *Sea-Fowls* from laying 10 or 12 Days longer than is ordinary.

4. A poor Man of *Rowdill*, in the Iſle of *Harries*, well known by the Name of *St. Clements Blind*, though his Sight ſerved him to travel alone through all *Harries*, *Skye*, &c. yet he was ſtruck *blind* (which confines him to his Bed) *two Days* before the *New-Moon*, at which Inſtant he recovers his *Sight*. In this he never erred once in his Life-time, for which he was called the *infallible Almanack*.

5. The *Children* of *Ferintoſh* in *Roſs* are taught from their Infancy to drink *Aqua Vitæ*, and are obſerved never to have any *Worms*.

6. Many in the *Highlands*, who pretend not to any Skill in *Chirurgery*, do venture to cut the *Uvula* off when they are troubled with it, and preſcribe for a Remedy thereafter a Piece of Bread and Cheeſe: Which is attended with good Succeſs, without hindering the Speech.

7. In many of the *Iſles*, the Commons apply *Spearwort* for *Pains* of the *Head*: It being bruiſed and applied, raiſes a *Bliſter*, from which iſſues

much Matter; and this they find very effectual for *Pains* in the *Eyes*, *Head*, *Arm*, or *Leg*.

8. They do likewiſe beat the *Juice* out of it, which they drink for *Purging*; which they do frequently with good Succeſs; and to prevent *Excoriation* of the *Throat*, they drink a little *melted freſh Butter*.

9. *Anna George*, who continued in the State of *Virginity* till the 51ſt *Year* of her Age (as is evident by her Declaration on her Death-bed), married, and brought forth a Boy in the 52d *Year* of her Age, having two *Teeth* in his Head.

10. Another Woman in *Lewis* was 7 *Years* bringing forth a *Child*, *Bone* after *Bone*, and all by the *Fundament*.

11. A *Boy* in the Iſle of *Skye*, aged 16 *Years*, has a Faculty of erecting his *Ears* at his *Pleaſure*. There are ſeveral Towns in *Skye*, where the *Sheep* have no *Marrow*: All theſe Towns are *rocky*, *high*, and very *windy*.

12. The Inhabitants of *St. Kilda* are every Summer infected with a *Cough* upon the *Chamberlain's* Landing, which laſts for 10 or 12 *Days*, and the uſual Remedy for it is *Gibben* drank upon *Brochan* of Meal and Water. This *Gibben* is the *Fat* of *Sea-Fowls* preſerved in the Stomach; a ſoveraign Remedy for *Coughs* and *Green Wounds*.

Several Things in Ireland *in common with the* Weſt-Indies; *by Dr.* Tho. Molineux. *n.* 227. *p.* 507.

IX. That there is a ſort of Alliance between *Ireland* and the *Weſt-Indies*, appears in ſeveral Things, of which they partake both *in common*. For a they on the Coaſt of *New-England*, and the Iſland *Bermudas*, gather conſiderable Quantities of *Ambergreaſe*, ſo on the *Weſtern* Coaſt of *Ireland*, along the Counties of *Sligo*, *Mayo*, *Kerry*, and the Iſles of *Arran*, they frequently meet with large Parcels of that precious Subſtance, ſo highly valued for its *Perfume*. In the *Year* 1691, Mr. *Conſtantine*, an Apothecary of *Dublin*, ſhewed me one Piece of *Ambergreaſe*, found near *Sligo*, that weighed 52 Ounces. On the Outſide it was of a cloſe compact Subſtance, blackiſh, and ſhining like *Pitch*; but when it was cut, the Inſide was more porous, and ſomething of a *yellowiſh Colour*; not ſo grey, cloſe, and ſmooth, as the cleaneſt and beſt Sort of *Amber*; but, like it, ſpeckled with whitiſh Grains, and of a moſt fragrant Scent. I have ſtill a Piece of it by me that weighs above 6 *Drachms*, with ſeveral Samples of 3 or 4 other Sorts of *Amber*, all found on that Coaſt of *Ireland*; ſome intirely black as Pitch, others of a perfect white Subſtance, exactly anſwering the Deſcription of that Sort of *Amber Olaus Wormius* mentions in his *Muſeum*, under the Name of *Ambra Griſeæ nondum maturæ*. *p.* 34.

Nor is the kind of *Whale-Fiſh* that is often taken in *New-England*, and affords the true *Sperma Ceti*, a Stranger to the Coaſt of *Ireland*, that reſpects *America*. This we may properly, I think, with Dr. *Charleton*, call the *Cetus Dentatus*, from its large, ſolid, white Teeth, fixed only in the *lower Jaw*, to diſtinguiſh it from that Species that gives the *Whale-Bone*, moſt naturally named by *Ariſtotle*, *Myſticetus*, from its bearded, horny *Laminæ* in the *Roof* of its *Mouth*: Of which Kind likewiſe there have been 3 or 4 ſtranded in my Time, but on the *Eaſtern Coaſt* of this Country that regards *England*. *Hiſt. Animal*

This *Cetus Dentatus* is truly *figured* by *Johnſtonus* and Mr. *Ray*. There have been three of this Kind taken, to my Knowledge, in the Space of 6 *Years*, all on the *Weſtern* Coaſt of this Country; one near *Colerane*, in the County of *Antrim*; another about *Ship-Harbour*, in the County of *Donnegall*; and a 3d in *Aug.* 1691. 71 *Foot* long, towards *Bally-Shannon*, where *Lough-Erne* diſcharges its Waters into the *Weſtern Ocean*.

Hiſt. Piſc. Tab. II.
Ichthyolog. Tab. II.

And then it was I had an Opportunity of truly informing myſelf what Sort of Subſtance *Sperma-Ceti* is, and in what Part of the *Whale* 'tis found: Concerning which Matter, *Phyſicians* and *Naturaliſts* have given the World ſuch various and falſe Accounts. 'Tis truly nothing elſe but Part of the *Oil*, or *liquid Fat*, of this particular Sort of *Whale*; which *Oil*, at firſt, when confuſed and mixt, ſhews itſelf like a *whitiſh Liquor*, of the Conſiſtence and Colour of Whey; but laid by in Veſſels to ſettle, its Parts by Degrees ſeparate; that which is lighter, and ſwims at Top, becomes a clear *Oil*, pellucid like Water, ſerviceable for all the Uſes of common *Train-Oil*, got out of the *Blubber* of other *Whales*; and that which ſubſides, becauſe 'tis heavier, and of a cloſer Conſiſtence, candies together at the Bottom; and is what is ſold for *Sperma-Ceti*, at 12 *Shil.* the *Pound*, when 'tis thoroughly blanched and refined from all its Filth, and the remaining Parts of the *Oil*, that otherwiſe diſcolours it, and gives it a rancid offenſive Scent; of this Subſtance ſeveral *hundred Pounds* Weight may be gotten out of one *Whale*; but the cleanſing and curing of it is troubleſome, and requires no ſmall Art, Time, and Charge; which occaſions the Value of that which is thoroughly refined: The *Fat* of the whole Body affords it; but that of the *Head* gives the greateſt Quantity and pureſt *Sperma-Ceti*.

I have ſome Reaſon to believe, that to theſe Inſtances of *Amber-Griſe*, and *Sperma-Ceti* (beſides thoſe of the *Mooſe-Deer*, the *Horns* whereof are frequently found *under Ground*, and were formerly deſcribed, of which *Ireland* partakes more than any other Country of *Europe*, from its Neighbourhood with the *Northern America*), we may likewiſe add ſome of our more rare and ſpontaneous *Plants*, becauſe they are found growing only in thoſe *Weſtern* Parts of *Ireland*, and no-where elſe in the whole Country, or any of the neighbouring Kingdoms about us. I ſhall mention but 2 or 3 of many which I have been told are peculiar to thoſe Parts; and thoſe are the *Arbutus ſive Unedo*, or the *Strawberry-Tree*, not to be found any-where of *ſpontaneous* Growth nearer than the moſt Southern Parts of *France*, *Italy*, and *Sicily*, and there too 'tis never known but as a *Frutex* or *Shrub*: Whereas in the rocky Parts, in the County of *Kerry* about *Lough-Lane*, and in the *Iſlands* of the ſame *Lough*, where the People of the Country call it the *Cane-Apple*, it flouriſhes *naturally* to that Degree, as to become a large tall Tree. *Petrus Bellonius* takes notice, that it does ſo in Mount *Athos* in *Macedonia*; and *Juba* is quoted by *Pliny*, as mentioning a Thing extraordinary, for ſaying the *Arbutus* grows to a high Tree in *Arabia*. The Trunks of thoſe in *Ireland* are frequently 4 *Foot* and a *half* in Circumference, or 18 *Inches* in Diameter, and the Trees grow to about 9 or 10

Vid. *Vol.* II. *Cap.* III. *Sect.* XXXVI.

Yards in Height, and in ſuch plenty, that they now cut them down, as the chief Fuel, to melt and refine the Ore of Silver and Lead-Mines, lately diſcovered near the Caſtle of *Roſs*, in the County of *Kerry*.

The other Plant I ſhall take notice of, is *Cotyledon, ſive Sedum Serratum, Latifolium Montanum Guttato flore Parkinſoni & Raii*, vulgarly called by the Gardeners *London-Pride*, I ſuppoſe, becauſe of its pretty elegant *Flower*, that, viewed near at Hand, and examined cloſely, appears very beautiful, conſiſting of great Variety of Parts. The whole Plant is moſt accurately deſcribed by that profound Naturaliſt Mr. *Ray*: But he knew no certain Place, where it grew ſpontaneous, not having met with it in all his Travels, nor any Author mentioning its native Country. It grows plentifully here with us, in *Ireland*, on a Mountain called the *Mangerton* in *Kerry*, 6 or 7 Miles over, and reputed the higheſt in *Ireland*, 2 Miles from the Town of *Killarny*, and 4 Miles from the Caſtle of *Roſs*. Here it ſpreads itſelf ſo abundantly, as to cover great Part of the Mountain; and foraſmuch as I underſtand, like the *Arbutus*, it is peculiar to this County alone.

New England *Rarities*.

Whether both the foregoing Plants are truly *American*, I cannot at preſent determine; but this I know, that *Sabina Vulgaris*, or common *Savin*, is mentioned by Mr. *Joſſelyn*, as a Plant common on the Hills of *New-England*; and I have been aſſured by an Apothecary of *Dublin*, that he has gathered *Savin*, growing wild as a native Shrub, in one of the Iſlands of *Lough-Lane*, in the County of *Kerry*; and if ſo, I have reaſon to believe, that hereafter farther Inquiry may add to theſe I have here given, ſeveral other Examples of Things natural and common to that and this Country.

Obſervations made in a Voyage *from* England *to the* Caribbee Iſlands; *by Dr.* Stubbs. *n.* 27. *p.* 493.

X. 1. I took notice at *Deal*, where I ſet Sail for *Jamaica*, of the great Difference in the Ruſting of Iron, in ſuch Houſes as front the Sea, in compariſon of, that Effect in the Street immediately placed behind that other in which I made this Obſervation. They told me, that it ruſted more at high Floods than at neap Tides, the Height of the Beach hindering the ſaline Exhalations. This Remark put me in mind of the Vanity of the Argument of M. *Ligon's* and others, *viz.* That the Air of the *Weſt-Indies* was hot and moiſt, becauſe of the Ruſting of Iron; whereas it indeed ariſes from ſome other Principle in the Air: For at the Point of *Cagua*, where it ſcarce raineth 40 Showers in a Year, Iron ruſts as much or more than any where; yet are there other Parts of the Iſland, in which, of 9 Months, not one paſſes without great Rain. Beſides, in *Jamaica*, it ruſts leaſt in rainy Weather.

The Steams of the Sea are found of ſuch a Nature, that our Sweet-meats rotted; Sugar of Roſes, and other Lozenges, grew moiſt; and thoſe Pyes and Gammons of Bacon, which had kept well before, after they had been once expoſed to the open Air, decayed more in a Day or two, than in 6 Weeks before.

On the Point *Cagua*, the Iron Guns of the Fort were ſo corroded, that ſome were near become uſeleſs, being perforated almoſt like Honey-combs; but the Guns which lay in the Salt-water, were not much endamaged by Ruſt, as we found upon taking up of ſome.

Many Things receive Damage by the Air: Not only Iron ruſts, but even Linen rots; and Silks once expoſed to the Air, do rot without loſing their Colour. If a Lancet be once expoſed to the Air, it will ruſt, though you preſently put it up again; but if it be never expoſed to the Air, it will hardly ruſt.

At *Deal*, a certain Ale-ſeller will warrant, that the Ale, as he orders it, ſhall be carried good to the *Weſt* or *Eaſt-Indies*. His Way to prepare it is this (as he told me himſelf) he twice maſhes it with freſh Malt, and twice boils it well; yet all this kept it not from Souring, as I obſerved during my Stay there. We bought of it to carry to *Jamaica*, and then he directed us thus; To every Rundlet of 5 Gallons, after it is placed in the Ship, not to be ſtirred any more, put in two new-laid Eggs whole, and let them lie in it; he ſaid, that in a Fortnight or little more, the whole Egg-ſhells would be diſſolved, and the Eggs become like Wind-Eggs, incloſed only in a thin Skin; after this, the whole White would be preyed on, but the Yolk would not be touched or corrupted. By this means we did preſerve the Ale to *Jamaica*, and it was much better than at *Deal*.

Concerning the *Thames-Water*; It is not only obſervable, that in 8 Months time it acquires a ſpirituous Quality, ſo as to burn like Spirit of Wine (and ſome *Eaſt-India* Ships, I am informed, have run the Hazard of Firing, by holding a Candle near the Bung-hole at the firſt Opening of the Caſk), but alſo that the Stinking of it is no Corruption, nor perhaps unwholſome; for we drank it all the Way, ſo as to hold our Noſes, yet had no Sickneſs; but we had a Proportion of Brandy each Week, which perhaps might correct it. If you take off the Bung from any Caſk that ſtinks, and let the Air come to it, it will in 24 Hours become ſweet again; and if you take a Broom-ſtick, and ſtir it about well, it will become ſweet in 4 or 5 Hours, caſting a black Lee to the Bottom, which remixes with it, and ſo occaſions a 3d or 4th Fermentation and Stench; after which it ſtinks no more. But though *Thames-Water* upon Stench do not putrify, yet other Waters (as far as hath been hitherto obſerved) do become irrecoverable upon ſtinking, and dangerous to drink.

I obſerved at Sea, after we were out of the *Narrow*, the Sea grew darkiſh, and after perfect Azure; yet was it much more ſalt the farther we went, as I tried by a Water-Poiſe, which roſe about half an Inch above the Sea-Water in the Downs, and at 24 Degrees more, 2 Inches: But after that I never obſerved any Difference unto *Jamaica*, the Sea being probably ſo impregnated with Salt, as not to imbibe more.

As to the Colour of the Sea, I conceive there is a great Variety in it and its Steams, as in Grounds at Land; which may occaſion the Sickneſs in ſome Places more than in others: For the Sea ſmells differently in the

Narrow

Narrow and *Main*: And as to *Colour*, it is of a *Sea-green*, and more *ſickly* in the *Downs*, than at *Torbay*; and on *Plymouth Coaſt*, more than paſt the *Land's-End*; and in the *Bay* of *Biſcay*, than in the *Long-Reach*. Something perhaps may be imputed to the Difference of the *Waves*, which are *ſhort*, and make a *Copling-Sea* in the *Bay* of *Biſcay* (yet we came not within 80 *Leagues* of Cape *Finis-Terræ*). In the *Long-Reach* it is a *long rolling Wave*, but never *breaks*. About *Florida*, *Virginia*, and *New-England*, it is a great *rolling Wave*, but *breaks*. And as the *Sea* coloureth from *Green* to *Darkiſh*, and ſo to *Blue*; ſo in our Return it coloured from *Blue* to *Dark*, and ſo to *Green*. When we were in the Latitude of *Barbados*, and had ſailed ſo for ſome Days, and apprehended ourſelves to be within 70 or 80 *Leagues*, I obſerved the *Sea* was black and thick, not tranſparently *Blue*, as before, and the Foam againſt the Ship Sides was turbid, and of another Conſiſtence than before: but when the Sun was high, it turned *Green*; whereupon I aſked the Maſter, who told me we were within 60 Leagues of *Barbados*, and that the Sea was there ſoundable, whereas before it was not ſo. But at *Barbados*, in the Anchoring-place it was *Blue*; as we rowed aſhore, in the Shallow it was *Whitiſh*: And ſo at *Jamaica*, near the Shore, it is tranſparently *White*, but within three *Yards* more tranſparently *Blue*.

As to the Burning of the Sea, I could never obſerve ſo great a Light, as to perceive Fiſhes in the Sea off the Stern; yet was the Light great, and at ſome times more than other. I ſuppoſe ſeveral ſubject Earths, Currents, and Winds, do vary it. I obſerved it burned more at *Deal* the Night before we ſet Sail, than ever in the Voyage. All the Water ran off our Oars almoſt like liquid Fire; the Wind was then S. E. and the Seamen told me, that at Eaſt and South Winds it burnt moſt.

I ſhall not trouble you with an Account, how two contrary Winds poiſe each other, and make a Calm in the Midſt, Ships at a Diſtance ſailing with contrary Gales at the ſame Time.

It is obſervable, that in the *Indies*, ſuch Places as have any high Mountains, have alſo every Night a Wind, that blows from the Land, maugre the *Levantine* Wind which blows at Sea, but with a ſlacker Gale at Night; which ſeems to ſhew, it depends not only on the Motion of the Earth, but Sun. There is none at *Barbados* or *Saona*, but at all the other Iſlands: And in *Jamaica* every Night it blows off the Iſland every Way at once, ſo that no Ship can any-where come in by Night, nor go out but early in the Morning, before the Sea-breeze come in. I have often thought on it, and could imagine no other Reaſon, but that thoſe Exhalations, which the Sun hath raiſed in the Day, make haſte (after his Strength no longer ſupports them) to thoſe Mountains, by a Motion of ſimilar Attraction, and there gather in Clouds, and break thence, by their own Force and Weight, and occaſion a Wind every Way: For as the Sun declines, the Clouds gather, and ſhape according to the Mountains; ſo that old Seamen will tell you each Iſland in the Afternoon towards Evening, by the Shape of the Cloud over it. And this Attraction appears further, not only from the Rain that gathers on the Tree in the Iſland of *Ferro*, ſpoken of by Sir *R. Hawkins* in his Obſervations, and *Iſ.*

Voſſius upon *Pomponius Mela*, as alſo *Magninus de Mainus*, but alſo from *Sect.* XII. the Rains in the *Indies*; there being certain Trees which attract the Rain, ſo as that if you deſtroy the Woods, you abate or deſtroy the Rains. So *Barbados* hath not now half the Rains it had when more wooded. In *Jamaica* likewiſe, at *Guanaboa*, they have diminiſhed the Rains as they extend their Plantations. But to return to *Jamaica*: That this Night-Wind depends much upon the Mountains, appears by this, that its Force extends to an equal Diſtance from the Mountain, ſo that at *Port-Morant*, which is the Eaſtermoſt Part of the Iſland, there is little of Land-breeze, becauſe the Mountain is remote from thence, and the Breeze ſpends its Force along the Land thither. I ſhall further illuſtrate this kind of Attraction. In the Harbour of *Jamaica* there grow many Rocks, ſhaped like Bucks and Stags-Horns: There grow alſo ſeveral Sea-Plants, whoſe Roots are ſtony. Of theſe Stone-Trees (if I may term them ſo) ſome are inſipid, but others perfectly nitrous. Upon thoſe other Plants, with petrified Roots, there gathers a Lime-Stone, which fixes not upon other Sea-Fans growing by them: It is obſervable alſo, that a *Monchinel-Apple*, falling into the Sea, and lying in the Water, will contract a *Lanugo* of Salt-petre.

It is commonly affirmed, that the Seaſons of the Year, betwixt the Tropicks, are divided by the Rains and fair Weather, and 6 Months are attributed to each Seaſon. But this Obſervation holds not generally true: For at the *Point* in *Jamaica* ſcarce fall (as was hinted above) 40 Showers in a Year, beginning in *Auguſt* to *October* incluſively. From the Point you may look towards *Port-Morant*, and ſo along to *Ligenée*, 6 Miles from the *Point*; and you'll ſcarce ſee, for 8 or 9 Months, beginning from *April*, an Afternoon in which it rains not. At the *Spaniſh-Town* it rains but 3 Months in the Year, and then not much. And at the ſame Time it rains at *Mevis*, it rains not at the *Barbados*. And at *Cignateo* (otherwiſe called *Eleutheria*) in the Gulph of *Bahama*, it rains not ſometimes for 2 or 3 Years; ſo that that Iſland hath been twice deſerted for want of Rain to plant it.

At the *Point* of *Jamaica*, where-ever you dig 5 or 6 Foot, Water will appear, which ebbs and flows as the Tide. It is not ſalt, but brackiſh; unwholſome for Men, but wholſome for Hogs. At the *Caymans* there is no Water, but what is brackiſh alſo; yet is that wholſome for Men, inſomuch that many are recovered there by feeding on Tortoiſes, and yet drink no other Water. The Blood of Tortoiſes is colder than any Water I ever felt there; yet is the Beating of their Heart as vigorous as that of any Animal (as far as I have obſerved) and their Arteries are as firm as any Creatures I know: Which ſeems to ſhew, it is not Heat that hardens the Coats of the Arteries, or gives Motion to the Heart. Their Lungs lie in their Belly, below the Diaphragm, extending to the End of their Shell. Their Spleen is triangular, and of a firm Fleſh (no *Parenchyma*) and floridly red. Their Liver is of a dark Green, inclining to Black and *Parenchymatous*. In the *Oeſophagus* are a Sort of *Teeth*, with which they chew the Graſs they eat in the Meadows, which there grows at the Bottom of the Sea. All the Tortoiſes from the *Caribbees* to the Bay of *Mexico* and *Honduras*, repair in Summer to the *Cayman*

Iſlands to lay their Eggs, and to hatch there. They coot for 14 Days together, then lay in one Night ſome 300 Eggs, with White and Yolk, but no Shells; then they coot again, and lay in the Sand; and ſo thrice: Then the Male is reduced to a kind of Jelly within, and blind, and is ſo carried Home by the Female. Their Fat is green, but not offenſive to the Stomach, though you eat it as Broth ſtewed. Your Urine looks of a yellowiſh Green, and oily, after eating it.

There is no manner of Earth, but Sand at the *Point*; yet I have eaten admirable Melons, Musk, and Water-Melons, that have grown there. A great many Trees alſo grow there, eſpecially Mangranes, and Prickle-Pears.

In ſome Ground, that is full of Salt-petre, your Tobacco, that grows wild, flaſhes as it is ſmoked.

The Fruit of Trees there of the ſame Kind ripen not at one time: There is a Hedge of Plum-Trees of three Miles long, as you go to the *Spaniſh-Town*; on it I have many times remarked ſome Trees in Flower, others with ripe, others with green Fruit, and others to have done bearing, at the ſame time. *Jaſmins* I have ſeen to blow before their Leaves, and alſo after their Leaves are fallen again.

The *Sower-Sap*, a pleaſant Fruit there, hath a Flower with 3 Leaves; when theſe open, they give ſo great a Crack, that I have more than once run from under the Tree, thinking it all to be tumbling down.

There is a Bird, called a *Pelican*, but a kind of *Cormorant*, that is of Taſte fiſhy; but if it lie buried in the Ground but two Hours, it will loſe that Taſte, as I have been told for certain.

I tried ſome Analyſis of Bodies, by letting Ants eat them; and I found that they would eat brown Sugar, white, and at laſt reduced it to an inſipid Powder; ſo they reduced a Pound of Salet-Oil to two Drachms of Powder.

At our firſt coming there we ſweat continually in great Drops for three Quarters of a Year, and then it ceaſeth: During that Space I could not perceive myſelf or others more dry, more coſtive, or to make leſs Urine than in *England*; neither does all that Sweat make us faintiſh. If one be dry, it is a Thirſt generally ariſing from the Heat of the Lungs, and affecting the Mouth, which is beſt cooled by a little Brandy.

Moſt Creatures drink little or nothing there, as Hogs; nay, Horſes in *Guanaboa* never drink; nor Cows in ſome Places of the Iſland for 6 Months; Goats drink but once perhaps in a Week; Parrots never drink, nor Parokeets nor Civet-Cats but once a Month.

The hotteſt Time of the Day to us is 8 in the Morning, when there is no Breeze. I ſet a Weather-Glaſs in the Window, to obſerve the Weather, and I found it not riſe conſiderably at that time; but by Two of the Clock it roſe two Inches.

Venice-Treacle did ſo dry in a Gallipot, as to be friable; and then it produced a Fly, called a Weavil, and a Sort of white Worm. So did the *Pilulæ de Tribus* produce a Weavil.

There is in the midſt of the Iſland a Plain, called *Magotti Savanna*, in which, whenſoever it rains (and the Rain paſſeth along the Iſland before it falls there) the Rain, as it ſettles upon the Seams of any Garment, turns, in half an Hour, to Maggots; yet is that Plain healthful to dwell in.

Additional Obſervations. n. 36. p. 699.

All the Alteration our Sweet-meats and Lozenges, and Gammons of Bacon, underwent, muſt be attributed to ſome peculiar Principle in the Air; for in all our Voyage to the *Barbados* we had not one Shower, that I remember: And if any will have the Air moiſt, whilſt a conſtant *Levant* (that is, a drying) Wind fills our Sails, at leaſt during the *Long-Reach*, how comes it to paſs, that ſo much Heat joined with Moiſture doth not occaſion putrid Fevers? And why, in all that Journey, and after in *Jamaica*, when the Glaſſes for many Weeks ſtood open and uncovered, did not the lixiviate Salts of Wormwood and Aſh contract any Moiſture? I am ſure I never ſet any Salts in the Sun, or near a Fire, during my Stay there, to preſerve them, or to reſtore them to their coagulated Form: Nor will other Sea-Salts there loſe much, if not kept dry by a Fire; no, nor lying on the Ground: For I have ſeen it kept ſo; yet if it immediately touch the Ground, ſome of it will moiſten away. But I have ſeen Tortoiſes dry-ſalted, and lie on the Ground covered with Salt a Year, and the Salt, under all the Viciſſitudes of Weather, never give much, or ſpoil the ſalted Tortoiſe.

The Way of drinking Brandy with Water, which Sir *Chriſtopher Mings* obſerved, was this: *Firſt*, to take a Mouthful of Brandy, and whilſt it was yet hot in your Mouth and unſwallowed, to drink the Water, and ſo waſh it down, it being his and a common Obſervation at Sea, that it was ever wholſomer to drink it ſo, than either mixed with the Water, or after it. For, ſaid he, if you drink the Water firſt, it gives inſtantly ſuch an Impreſſion of the Coldneſs to your Stomach and Lungs, as that it is too late to correct it by the ſucceeding Brandy. Which Reaſon I could not but allow of; for in thoſe Parts the Paſſages or Poroſities of the Body are ſo pervious, that what you drink, though cold, inſtantly diſchargeth itſelf in Sweat, or checks your conſtant and neceſſary *Diaphoreſis* before you can get the ſubſequent Brandy down. And Man is ſo exact a Machine, that a much leſs thing diſorders him there than here. And if a little Brandy ſhould be mixed with a Draught of Water, it would not be efficacious; the Coldneſs of the Water being more powerful in Bodies ſo tender as we are here, if hot, to hurt them, than ſo little Brandy to correct it. But the other way waſhes the Brandy down firſt, and as that goes, it fortifies Nature every-where to receive and diſtribute the ſubſequent cold Liquor.

About the Colour of the Sea, I have this to add, that as we went and paſſed from a green Sea to an azure, in the Way, when it was dark-coloured, he Top of each Wave, as it was caſt up before the Sun, ſhewed itſelf to be zure, the reſt of the Wave being Dark-coloured, approaching to Black. And the like I obſerved coming Home: For though the Sea in its dark Colour reſembled exactly what we ſaw before, as we went out; yet did he Tops of the Waves break and appear Green, long before the great

Waves or Body of the Sea became Green. I obſerved that the Sea, which was azure, and tranſparent in Sunſhiny Days, was black and dark-coloured, and much leſs tranſparent, when the Sun did not ſhine; but in the Green-Sea there happens not the like Difference.

As to thoſe Plants, whoſe Roots I ſaid were ſtony, it may be noted, that ſome of their Roots are totally petrified, ſome only in part; the reſt being of another Kind of more vegetable-like Conſiſtence, whilſt the Boughs and Trunk are of another Nature.

Of the Water at the *Point* of *Jamaica*, I ſhall further obſerve, that though the Sand does ſo percolate, that you find it upon digging 5 or 6 Foot deep, yet from that Sand there ariſes no Steam into the Air, notwithſtanding the Heat of the Country. For Proof hereof, I obſerved that Men would lie all Night, and ſleep on the Sands without Hurt. And to take Notice of that Particular upon this Occaſion, it is an uſual Thing for the Weavil (or Fly that breeds in Meal, Currans, Raiſins, &c.) to be thus cured: After that the Sun hath heated the Sand, they ſpread a Sheet, and on that ſpread their Meal, Currans, &c. The Sand being hot under, the ſaid Weavils retire from the Bottom to the upper Parts; and theſe being heated, they retire all into the Middle; and thence being heated, they are forced to run away out, and are ſo ſwept away. And if you ſpread the Sheet on the firm Ground, though never ſo much heated with the Sun, it will preſently grow damp there, and the Weavils will lodge themſelves at the Bottom; ſo as that you can never ſeparate them any-where elſe but on the Sand. Alſo in the Nights I obſerved, that between the other Ground and our pendulous Hamacks, there gathered not only a greater Coldneſs of Air, but alſo Moiſture, than was obſervable at the *Point*, when we hung in the like Poſture. It is true that the Reaſon is obvious, why there ſhould be an Air under the narrow Paſſage betwixt the Hamack and the Ground, which is not obſervable above it; but there is alſo a Dampneſs, ſo that I was forced to put two Blankets betwixt me and the Bottom, whilſt I had none to cover me at the Top.

During an Hour or two's Stay at the *Caymans*, I examined that Aſſertion of M. *Ligon*'s, that a Tortoiſe hath three Hearts, and I found it falſe; for altho' the Reſemblance of the two Auricles be ſuch, as alſo their Bodies or Fleſh, as to deceive the unwary Obſerver, yet there is but one Heart, triangular and fleſhy; the other two are only the Auricles, yet of the ſame Shape and Body. The two Auricles move at a ſeveral Time from the Heart, and they are diſtanced from the Heart about an Inch, and the Paſſage fleſhy (as I remember) and narrow, by which the Blood is infuſed into the Heart. This Heart hath but one Ventricle; yet there are ſeveral Columns of Fleſh and Receptacles in it, ſuch as are not in the Auricles.

The Graſs of the ſubmarine Meadows is not a Span long, that I could obſerve, and is of a Green approaching to Yellow. The Tortoiſes bite much more than they ſwallow, ſo that the Sea is covered with the Graſs, where they feed, at the Bottom. Once in about half an Hour they come up and fetch one Breath, like a Sigh, and then ſink down again: And if out of the Water, they breathe ſomewhat oftener. If you hurt them on Shore, as they lie on their Backs, the Tears will trickle from their Eyes. You may keep them out of the Water 20 Days and more, and yet they will be ſo fat as to be fitting Meat, provided you give them twice a Day about half a Pint of Salt-Water. The Fat that is about their Guts is yellow, though that of the Body be green. The Head being cut off, dies inſtantly; and if you take out the Heart, the Motion continues not long: But any Quantity of the Fleſh will move, if pricked, and alſo of itſelf for many Hours after it is cut into Quarters; and the very Joints of the Bones of the Shoulders and Legs (anſwering our *Omoplate* and Thigh yet within the Shell) have their Motion, and even though you prick only the Fat of it: But if you place theſe Parts of the Tortoiſe in the Sun, they preſently die. The Legs die as ſoon, in a manner, as cut off.

The Eggs of *Crocodiles* and *Alligators* are little bigger than a Turkey's; The Shell is as firm, and like in Shape to a Turkey's, but not ſpotted. I inquired into the Stone in the Stomach of a *Cayman*, or *Crocodile*, and I found, by the Inquiry of a very obſerving Gentleman there, that they were nothing but ſeveral Stones, which that Creature ſwallows for Digeſtion. He took out of one a Piece of a Rock as big as his Head; out of others he had taken 16 or 20 leſſer. None regards them much there, whatever *Monardes* relateth.

I could not hear of any Stones found in the Gall of the Hogs there; but it is uſual to find little Stones in their Bladder of ſeveral Sizes; but the Shapes of them (none weighing a Scruple) were angular, and pointed with five Angles.

De Laet is in the right as to his Deſcription of the *Manati-Stone*: But he is out in his *Lapis Tiburonum*; for though a *Tiburon* and *Shark* be all one, and differ from a *Manati*, or *Sea-Cow*; yet, by his Leave, though that ſame be a kind of friable Calx when it is brought hither, yet when it is firſt taken out, it is not ſo, but a white Subſtance, near approaching to the Nature of any Brain, and encompaſſed in a tranſparent Jelly: The Jelly dries all away, as it is expoſed to the Sun; and the white Subſtance dries into the Body he ſpeaks of. If my Memory fail me not extremely, it is taken out of two Places over each Eye; and both being uſually by Seamen put into the ſame Paper together, to dry, paſs for one. That Creature hath no Bone in his Back, as vaſt as his Strength is; only in his Head there are Bones. His Jaws are Griſtles; and he hath Rows of Teeth, which are Bones like Lancets, and moveable in him, to erect, or lie flat; and multiply to 3, or 4, or 5 (perhaps more), as he grows in Years. His Back-bone is all griſtly, and ſo are his Ribs, yet divided into *Vertebræ*. The Seamen uſually cut them into Walking-Staves. They and the Dolphin ſwim faſter than any Ship ſaileth; ſo do the *Spaniſh Mackarel* alſo.

Civet-Cats, if you do not give them Drink at all, they will not die in a longer Time than a Month: But if they drink once a Month, they will yield more Civet, as I was told; and ſo if they be fed with Fiſh: Yet they piſs much, as do Rabbets. In thoſe Places where there is no Rain for a whole Month, or longer, nor any River or Pond, Cows lick the Dew, for a Supply. A Butcher killed a Bull in an Iſland, where he could have no Water but what was ſalt. He aſſured me, that his Bladder was dried up, ſo that he made very little or no Water; yet he muſt be gueſſed to have lived in that Iſland before the *Engliſh* came thither; which was 6 Years before he was killed.

The Swallows in *Jamaica*, as hot as it is, depart in the Winter Months, and the Wild-Ducks and Teal come hither then.

The ſo famed Tree, called a Cabbage-Tree, I aſſure you, is nothing elſe than a Palm-Tree; and all that is eaten as the Cabbage, is what ſprouted out that Year, and ſo is tender. If eaten raw, it is as good as any new Almonds; and if boiled, excels the beſt Cabbage. When that Top is cut off, the Tree dies. There was one of thoſe Trees at *Barbados*, above 300 Foot high, as I was told for certain. This Tree will never rot, and when it is dried, grows ſo hard, that you cannot drive a Nail into it.

It is a Miſtake (above) that any Tobacco grows wild, in *Jamaica* at leaſt. The Nitrous Tobacco, which grows upon Salt-petre Ground, will not come to ſo good a Colour, nor keep ſo long, as other Tobacco; inſomuch that the Merchants oftentimes loſe all their Tobacco in the Voyage for *England*, or *Ireland*, it rotting all by the Way. In the ſame Salt-petre Ground the Potatoes, that are planted there, are ripe two Months ſooner than elſewhere; but if they be not ſpent preſently, they rot, the Salt-petre (as they told me) fretting the outward Skin of the Root, which is thinner in that Sort of Ground than in other Places. The Sugar-Canes alſo in thoſe Places grow larger and faſter than in other Grounds, but rot preſently, if out of Ground, and do not boil ſo well to Sugar.

In *Jamaica* the Sugar cures faſter in 10 Days, than in 6 Months at *Barbados*: And this happens on theſe Places, where it rains for many Months together; but you muſt know, that Rains there are ſudden, and make no previous Alteration in the Air before they fall, nor do they leave it moiſt afterwards.

There is a Tree, called a *Baſtard Cedar*, whoſe Wood is really ſo porous (though you would not gueſs ſo upon View), that being turned into Cups, Wine and Brandy will ſoak through at the Bottom in a ſhort time.

There are many Kinds of Wood in the *Indies* beſides that of the *Acajou*, or *Cajous*, that breed no Worms: And there is a Tree, called White-Wood, in *Jamaica*, of which if you build Ships, they will never breed any Worm.

The *Soap-Tree*, I have ſeen growing at the *Spaniſh Town*, and the Berries of it (being as big as Muſket-Bullets) without any Proportion of *Salt-Lixiviate*, or Sulphur, or Oil, waſh better than any *Caſtile-Soap*; but they rot the Linen in time.

They have in *Jamaica* three Barks to tan with, the *Mangrave*, *Olive-Bark*, and another. They tan better than in *England*, and in 6 Weeks the Leather is ready to work into Shoes.

The Juice of *Manioc*, or *Caſſavi*, is rank Poiſon. All Hogs and Poultry that drink it, ſwell and die preſently. If the Root be roaſted, it is no Poiſon, but only occaſions Torſions in the Belly,

Concerning the Oil of *Palma Chriſti*, the *Indians* uſe it for Lamps. It is a delicate, ſweet, and tranſparent Oil; but I could never find it operate in Phyſick, notwithſtanding I have given a Spoonful of it, and three in a Clyſter. This *Palma* does yield an exceeding great Quantity of Oil, and, did we mind any thing, might be a Staple Commodity. The Leaves applied to the Head, give great Eaſe in the Head-ach, as I have tried it myſelf; and it is the only Remedy of the *Indians* and *Negroes*.

The *Manchinel-Tree* is a Wood of an excellent Grain, equalling the *Jamaica Wood*, but large to 4 Foot Diameter. The *Spaniards* turn it into Beds, and the *Engliſh* uſually floor their Rooms with it in *Jamaica*.

The Birds, called by ſome *Fregati*, we call Men of War: Their Fat is good againſt Aches, *&c.* ſo is that of the *Alligators*, or the *Shell-fiſh*, called *Soldats*, or *Soldiers*.

Of the *Shining*, or *Fire-Flies*, there is a great Difference in *Hiſpaniola* and *Jamaica*, as to Bigneſs. They can contract and expand their Light as they fly, I am ſure; and their Light continues ſome Days after they are dead: So that I am not of their Mind, who affirm, that it is the *Flammula Cordis* in their Tail.

The *Wood-Lice* will eat Covers and Books, though printed, as I found to my Coſt; and they will eat ſome Sorts of Timber, but not all.

When the *Cirons*, or *Chegoes*, come among the nervous and membranous Parts, they are very painful, and not to be pulled out, leſt your Needles touch the Nerves.

I could never hear of any Hurricane about *Jamaica*. I inquired of ſome that had been in Hurricanes, and they told me, that they had found it to be much colder then, than at other times. I inquired of the Nature of theſe Tempeſts, whether the Wind varied all the Points of the Compaſs, as it is ſaid. They anſwered, No; but it began always with a North Wind, and when it came Eaſt, it ceaſed: But betwixt the North and Eaſt Point it varied ſo faſt, and with ſuch a violent Guſt always, that it was impoſſible for any Ship in the Water to anſwer the Veering of the Wind: Whence it happens, that the Backs of the Ships are broken, and the Sails and Maſts carried by the Board. I ſaw a Veſſel, of about 400 Tun, whoſe Main-Maſt (which is no ſmall one in ſuch a Ship) was wreathed, as you would wreath a Withe, in an Inſtant, and ſo born by the Board; before ever they could hand a Sail.

As we ſailed for *England*, and were to double the Cape at the End of *Cuba*, in order to our paſſing the Gulph, betwixt the two Capes of *Carioocche* towards the Main, and Cape *Antonio* in *Cuba*, there is a Current which ſometimes ſets weſterly, ſometimes eaſterly: If it ſet eaſterly, the Ships have a ſpeedy Paſſage in three or four Days to the *Havanna*; otherwiſe it is a Fortnight or three Weeks Sail, the Ship being imbayed in the Gulph of *Mexico*. To know which Way the Current ſets in calm Weather, no Wind at all ſtirring, thus they try it: They hoiſt out their Boat, and having rowed a little from the Ship, yet let looſe their Plummet (ours did weigh 40 Pounds), and ſink it 200 Fathom. Then, though it never touches the Bottom, yet will the Boat turn Head againſt the Current (which conſtantly runs very ſtrongly of itſelf, ſince ſo much of Sea runs in the Gulph of *Mexico*); and rides as firmly, as if it were faſtened by the ſtrongeſt Cable and Anchor to the Bottom. If you wonder to hear me mention a Calm thereabouts, where you would expect a conſtant *Levantine* Wind, I ſhall inform you, that it is no unuſual Thing to meet with Calms, if you approach within any Diſtance of Land; for ſome Guſt, or Land-Wind, will ſo poiſe the Levantine Wind, that you ſhall have a perfect Calm.

The Change of Climate, and the Effects of it, are very ſenſible to our Bodies, as we approach the *Tropick*. There uſually happened Sickneſſes in our Ships about that Time; and as ſoon as the Seamen paſs the *Tropick*, they ſtill uſe Expreſſions of Joy, by firing of Guns, in Teſtimony of Gladneſs for their ſafe Arrival ſo far. I could not learn of the old Seamen any other Reaſon for the different Condition of Health, with which our Ships now ſail, in Compariſon of what our Anceſtors experimented, than this; Generally all our Seamen and Paſſengers let Blood in the Voyage before that Time; yet is not that to be done raſhly, nor by all in the ſame Degree of Latitude; for I carefully obſerved in our Ships the Alteration of our Bodies upon the Change of Climate, and found that the Blood of the *Engliſh*, which conſiſts of Parts more groſs, and is extracted from a more ſubſtantial Food, *viz.* that of Fleſh, than in other Countries, did attenuate; and the Pulſes in ſome became very lofty, full and quick; in others ſlow, yet more lofty and full than before. In ſome there was a Senſe of Pricking in their Fleſh; in ſome a great Dulneſs, and Oppreſſion of Spirits and Heavineſs; after which they paſs into a Condition of Sweating, which purſues them afterwards for a long time. From this Agitation of Humours, it is eaſy to ſhew the Reaſon why our Anceſtors fell ſick, and how neceſſary it is to bleed, when any feel thoſe Symptoms in him; for immediately upon Bleeding, the Pores are opened, and they fall to ſweat; and by this Courſe thoſe Numbers of People we carried over with us to *Jamaica*, arrived ſafe. Some I cauſed to be blooded in 32 Degrees, ſome in 28, ſome in 24 and 23 Deg. And in all our Ships there died but three. In our Ship two had the Diſeaſe, ſo much talked of, called the *Calenture*; but they were thus cured preſently: I was talking with one of them, and on a ſudden he beheld green Leaves, as he imagined, floating on the Sea, which yet was Azure-coloured: After that he began to admire the fine Woods, which he fancied to be near us. I immediately gave him a Vomit of the Glaſs of Antimony in Sack; which no ſooner had wrought its Effect, but all thoſe Imaginations vaniſhed. At Night I gave him ſome Conſerve of red Roſes vitriolated, Salt of Wormwood and Diaſcordium. The next Day he was blooded at the Arm in the Morning, and in the Forehead in the Afternoon. His Diet was Water-gruel with Cream of Tartar in it, and alſo ſome Prunes ſtewed. I could perceive nothing of any Fever in the Diſeaſe: His Pulſe was low, ſlow and equal: His Temper rather colder than ought to be; ſo far was he from any Senſe of Heat, or Diſcoloration of his Tongue, or Thirſt. The other Perſon imagined nothing but Groves of Oranges and Limons, and begged the Opportunity of a Boat to go aſhore with great Earneſtneſs; ſo that if not watched, perhaps he might have leaped into the Sea. The Symptoms were the ſame as in the other, only his whole Body eemed to be much colder, yet was not he ſenſible of any Coldneſs in himſelf. cauſed him to be vomited, and he was well in his Head, as ſoon as ever he Vomit made him ſick at the Stomach, as yet not having wrought. I ieted him as the other, and only blooded him in the Arm. I let them Blood erely out of Caution (for elſe they ſeemed well), and to promote Tranpiration and Sweating, which ſucceeded according to my Deſire.

Undoubtedly the Seat of that Diſeaſe is in the Stomach, and thoſe Parts djoining to it, in which the firſt Concoction is performed; and it is highly robable, that it principally ariſeth from the ill Diet, by eating too much lt Meat in Voyages, the ſaline Steams from the Stomach affecting the ain in a peculiar Manner.

As to the Cure, by Vomiting, I ſhall not now explain how Vomits work; ſufficeth that the Diſeaſe was ſeated in and about the Ventricle; and that hot Countries, as well as in hot Seaſons, the Rule of *Hippocrates* takes ace, *Æſtate per Superiora.* I never ſaw any good Effect of the moſt innont Purge, during my Stay in the *Indies*, except in chronical Diſtempers; or did I ever almoſt give any (after frequent Trials had made me cautious) Pills that were antimonial, or *Mercurius Vitæ*, or *Vomitive Infuſions*; and y this Method I preſerved our Ships well, and effected thoſe ſpeedy Cures, hich, I think, none had before ſeen in *Jamaica.* It is true, of the common ort in the other Ships, when we came to *Barbados*, upon View I found any *Hydropical* and *Scorbutical*: And as ſoon as we came there, I cauſed ll that were any thing ill to be vomited and purged with *Mercurius Vitæ*, e *Vomitive Infuſion*, and *Cambodia*; by which means, and one Meal of eſh Meat, and ſome Limons, all the diſorderly Rabble recovered.

The Sea-Breeze comes not into *Jamaica* till 8 or 9 of the Clock in the orning, and ordinarily ceaſeth about 4 or 5 at Night: But ſometimes the ea-Breeze blows in the Winter Months 14 Days and Nights together, and en no Clouds gather, but Dews fall. But if a North Wind blow (which metimes in the Winter Months laſts as long), then no Dews fall, nor Clouds ther. The Clouds begin to gather about 2 or 3 of the Clock in the Afernoon at the Mountains, and do not embody firſt in the Air, and after ttle there, but ſettle firſt, and embody there; the reſt of the Sky being lear till Sun-ſet; ſo that they do not paſs near the Earth in a Body, and ly ſtop where they meet with Parts of the Earth elevated above the reſt; ut precipitate from a very great Height, and in Particles of an exceeding ified Nature, ſo as not to obſcure the Air or Sky at all, that great Variety f beautiful Colours in the Canopy of Heaven being raiſed to a much greater iſtance than it is here.

The Obſervations continued. n. 37. p. 717.

The Tortoiſes float aſleep in a calm Day a long time; ſo that the Seamen ow gently to them, and either ſtrike them with Irons, or enſnare their egs with a Rope and Running-Net, and ſo take them.

I.

I could never adjuſt the Doſe of the Purging-Nuts, having given from 3 to 60, without any Effect in the ſame Perſon, ſo that I never durſt rely on them; yet they often do work, as is related.

Inquiring at the *Barbados* of the Doctors and Chirurgeons there, about the Uſe of *Opium*, ſo much magnified by *Bontius* and *Piſo*, I heard them all condemn it as moſt ſtupifying and mortal; and I found that they uſed the *London Laudanum*, which I have obſerved to be very *narcotick*, the *Opium* being extracted with Spirit of Wine. But I had a *Laudanum*, of M. *Le Fevre*, called *Laudanum Simplex*, of torrefied *Opium*, extracted with diſtill'd Vinegar and ſome other Correctives, which never ſtupifies, no, nor inclines to Sleep after 'tis taken, yet immediately eaſeth all Pain: I took it myſelf for 14 Days every Night in the *Bilious Colick*, which immediately eaſed the Pains, but perhaps I ſlept not till 2 or 3 Hours after; taking it with ſo much Security, that I very ſeldom weighed it, but gueſſed at a Pill of 2 or 3, or even 4 Grains. Nor hath this *Laudanum Simplex* (by his Obſervation) only this Effect in the *Indies*, where I uſed it in all Caſes to all Ages, even ſucking Children; but even here in *England* I gave it, not long ago, to a Lady in the *Colick Bilious*, never weighing it, and it eaſed her Pains; yet did ſhe never apprehend that ſhe had taken any ſuch Thing; and all the Night if any did but ſtir, ſhe could hear them as perfectly as ever ſhe could when ſhe ſlept naturally.

The Obſervation which *Oviedo* hath about Lice, which is, That they leave the *Spaniards* as they go to the *Indies* in ſuch a Degree, and meet them again in the ſame Latitude in their Return, is very true. For though the Ships we went in, with ſuch a Multitude of Servants and Seamen, were not over-cleanly, yet before we came to the *Tropick*, there were none louſy; whereas before one could not walk amongſt them, but his Cloaths would gather Lice. In the *Indies* none are louſy, how naſty ſoever, except it be in their Heads; and there they breed much. But in our Return home, I obſerved that they did multiply again, after we came to the Latitude of the *Madeiras*. Sir *Chriſtopher Mings* was of this Opinion, That when they approach the *Long-Reach* and *Tropick*, they begin to ſweat exceſſively; which Sweat abounding over the Body, choaks the old Lice, and kills them: Juſt thus, he ſaid, it was an uſual Remedy for louſy Heads, to rub them all over with Butter or Oil, and he would warrant it would kill all the Lice. And as for any new Generation, the Sweat not lodging in the Pores long enough, it was not diſpoſed to produce thoſe Vermin at all; for no Sweat in the *Indies* is rank, as in *Europe*, that ever he could obſerve. In their Return the Sweat lodgeth longer in the Pores and Habit of the Body, and the particular Forms or Ferments, being exalted and unlooſed, and put into Activity, ſhape out thoſe Creatures, and ſo they breed them. But if you aſk, Why they breed in the Head in the *Indies*? he anſwers, That though our Faces ſweat much, yet doth not our Hair ſo much; beſides that, the Sweat is lodged in their Hair, and there breeds the Vermin, and they take not the Care of their Heads there as here. However, the *Spaniſh*

Negroes waſh their Heads with Soap once a Week, to prevent being louſy, whilſt the other Negroes loſe a great deal of Time in looking after their Heads; which, by reaſon of their Curls, breed Lice more than the *Engliſh*; inſomuch that he affirms to have ſeen great Holes eaten by Lice in the Heads of ſome of them that were lazy.

In the *Colick Bilious* we often uſed Clyſters of Tobacco-ſmoke, but with no Succeſs at all. I alſo gave the Juice of Tobacco, an Ounce in a Clyſter, which ſtupified extremely, but did no other good, than for the preſent to render them inſenſible of their Pain. It is uſual to give Clyſters of a Pint of Brandy there, which will make them as drunk and mad as if they had taken it in at their Mouths: I obſerved that leſs Brandy would fox them in a Clyſter than if drunk by them. I tried a Quarter of a Pint in a Clyſter on myſelf, and it made me not dead drunk, but raging mad (though mixed with other things), my Reaſon being depraved by theſe Fumes: So I never took more of that Clyſter but once to reiterate the Experiment, the Effect being the ſame. But I complied with the *Spaniſh Negroes*, who, to nouriſh me, gave me a Clyſter of half a Pint of *Madeira Sack*, the Yolk of one Egg, and a little Pepper, warmed and given at Night, and to hold it in all Night; which did gently warm my Bowels, and caſt me always into a gentle Sleep and Sweat for ſome Hours: I took many of theſe in the Day-time, the Effect ceaſing after two or three Hours.

I am of Opinion that Chocolate, if it were well made and taken in a right Way, is the beſt Diet for *Hypochondriacks* and *Chronical Diſtempers*, and the *Scurvy*, *Gout*, and *Stone*, and *Women Lying-in*, and *Children New-born* (to prevent Convulſions, and purge the *Meconium* out), and many other Diſtempers, that ever came into *Europe*: But it is now rather uſed for *Luxury* than *Phyſick*, and ſo compounded as to deſtroy the Stomach, and to increaſe *Hypochondriacal Diſeaſes*.

The *Chegoes* breed commonly in the *Negroes*, yet no *Engliſh* get them but by going in Places frequented by them. They are incident moſt to ſuch as are naſty about the Feet; and very ſeldom any elſe have them. They will ſpread by little and little over the whole Feet, eat off Toes, and over-run the whole Body of ſome idle Negroes.

n. 41. *p.* 825.

2. *Alligators* are ſhaped like *Lizards*, being Four-footed; they walk with their Belly at a Diſtance from the Ground, like *Lizards*. Thoſe of a full Growth have Teeth like a Maſtiff, and a Mouth of $1\frac{1}{2}$ Foot wide. They are ſo ſtrong a Scent, that you may ſmell them at a pretty Diſtance when they lie on the Land. They may be maſtered and killed by any dextrous and ſkilled in the Way of doing it, which is, that a Man be armed with a good long Truncheon, and fall upon them Side-ways; for doing it Front-ways, they are too nimble for the Aſſailant, and may by leaping upon him (which they can do the Length of their whole Body) ſpoil him; but if he lay his Club on them againſt their Shoulder, and behind their Fore-feet, and lame them there, they are eaſily ſubdued.

Some of theſe Obſervations farther conſidered; by Mr. Norwood, *Jun.* *n.* 41. *p.* 824.

Tortoiſes, if their Blood be heated, die; and if they ſhall live, their Blood muſt not be hotter than the Element they live in.

The *Chegoes* are not felt to have got into the Body, till a Week after. They will breed in great Numbers, and ſhut themſelves up in a Bag; which when you feel, there are certain ſkilful Men, who with little Pain will take them out; having great Care to take out the Bag intirely, that none of the Brood (which are like Nits) may be left behind, for fear of giving Riſe to a new Generation.

The *Shining Flies* are a kind of *Cantharides*, looking green in the Day-time, but glowing and ſhining in the Night, even when they are dead. I have applied them dead to a printed and written Paper in the Dark, and read it.

The *Manchinel-Apple* is one of the beautifuleſt Fruits to the Eye, of the agreeableſt to the Smell, and of the pleaſanteſt to the Taſte (being thence called by many the *Eve-Apple*); but if eaten, certain Death. The Wood of it yet green, if rubbed againſt the Hand, will fetch off the Skin, or raiſe Bliſters; and if any Drops of Rain, falling from this Tree, light upon one's Hand, or other naked Part of the Body, it will alſo have the aforeſaid Effect.

Obſervations made at the Barbados; *by Dr.* Tho. Towns. *n.* 117. *p.* 399.

XI. At the *Barbados*, our general Draught of Wine is from the *Madeira*, which, contrary to all other I know of, will not endure a cool Cellar. *French* nor *Rheniſh Wines* neither keep nor agree well with our Stomachs, if ſo conſtantly drank as in *England*. *Canary Wine* few here care for, counting it fulſome.

This Iſland is very temperate; and the Sun, notwithſtanding his Neighbourhood, is very gentle, being fanned with a conſtant Gale from the Eaſt.

I obſerve that *Purſlane* is here all the Country over, where I have been, and even troubleſome to the Planter. In the Fields I have many times gathered a Sallet of it, and it eats as well with Oil and Vinegar as that of our *Engliſh* Gardens. Here is likewiſe a *Sonchus, Lens Paluſtris*: I found alſo a *Melilot*, or one ſo like it in all Circumſtances (except that the Branches are not ſo erect), that I cannot find any Difference from that of *England*.

The Springs here are all near the Sea; ſo that thoſe who live up in the Country have no Benefit of them. They made Ponds formerly to receive Rain; which ſerved well enough, being kept cool by a broad-leaved Weed and Ducks-Meat, which overgrew moſt Ponds: But now almoſt every Sugar Plantation hath a Well that gives very good Water.

The Soil is fertile, though not above a Foot or two thick upon a white and ſpungy Lime-Stone Rock, which affords good Quarries here and there, that ſerve for Building. Every Dwelling-houſe, with the Sugar-work and other Out-houſing, looks like a handſome Town; moſt being new-built with Stone, and covered with Pan-Tile or Slate, brought hither in the Ballaſt of Ships, as are likewiſe Sea-coal for Forges, and ſo are bought cheap enough. Indeed the whole Iſland appears in a manner like a ſcattered Town, which with the perpetual green Fields and Woods, makes the Place very pleaſant.

The *Blood* of *Negroes* is almoſt as *black* as their *Skin*. I have ſeen drawn forth the *Blood* of at leaſt 20, both Sick and in Health, and the Superficies of it all is as *dark* as the Bottom of any *European Blood* after ſtanding a while in a Diſh. So that the *Blackneſs* of *Negroes* is likely to be *inherent* in them, and not cauſed by the *Scorching* of the *Sun*, eſpecially ſeeing that other Creatures here, that live in the ſame *Clime* and *Heat* with them, have as *florid Blood* as thoſe that are in a *cold Latitude*; viz. *England*.

An Obſervation on Bermudas; *by Mr.* R. Norwood. *n.* 30. *p.* 566.

XII. I never ſaw any *Sand* in the *Bermudas*, ſuch as will grind Glaſs, or whet Knives, *&c.* as in *England*; but a Subſtance like *Sand*, though much ſofter: Neither have we any *Pebble-Stones*, or Flints.

Obſervations in New-Providence, Bermudas, *and* Virginia; *by Mr.* Rich. Stafford. *n.* 40. *p.* 794.

XIII. There is an Iſland among the *Bahamas*, which is called *New-Providence*, where many rare Things might be diſcovered, if the People were but encouraged. It is ſtored with Variety of *Fiſh* and *Fowl*, and with divers Sorts of *Trees*, and other *Plants*, whoſe Qualities are not yet known.

The Inhabitants here at *Bermudas* live ſome to an *hundred* Years and ſomething upwards; many do live till they are nigh an *hundred*, but few above: And when they *die*, it is *Age* and Weakneſs that is the Cauſe, and amongſt us is a *Cold*; and that is moſt gotten in the *hotteſt* Weather. The *Air* is here very ſweet and pleaſant. Our *Diet* is but ordinary, and the People generally poor; and I obſerve that poor People are moſt *healthful*.

That *Weed* which we call *Poiſon-Weed*, grows like our *Ivy*. I have ſeen a Man who was ſo *poiſoned* with it, that the Skin pealed off his Face, and yet the Man never touched it, only looked on it as he paſſed by; but I have chewed it in my Mouth, and it did me no Harm. It is not hurtful to all.

Here are *Spiders*, that ſpin their *Webs* betwixt Trees ſtanding 7 or 8 *Fathom* aſunder; and they do their Work by *ſpirting* their *Web* into the *Air*, where the Wind carries it from Tree to Tree. This *Web*, when finiſhed, will ſnare a *Bird* as big as a *Thruſh*.

We cover our Houſes with the *Leaves*, not the *Bark* of a *Tree*, which is the *Palmetto*; without which *Tree* we could not live comfortably in this Place. The Leaves of ſome of theſe Trees are 8 or 10 *Foot* long, and nigh as broad.

It is reported, that in *Virginia*, and upon the Coaſt of *Florida*, the *Indians* live to a very great *Age*; and that ſome of the People are of a *gigantick Stature*, and ſtronger by far than others.

A Voyage to New Caledonia *in* Darien; *by Dr.* Wallace. *n.* 262. *p.* 536.

XIV. *Sept.* 2. 1699. We weighed at *Madera*, and were under the *Tropick* of *Cancer* by the 10th of the Month, at which time the uſual Ceremony of *Ducking* from the *Yard's Arm* was performed on thoſe that could not pay their *Tropick Bottle*. All this time we had a briſk and conſtant *Trade-Wind*,

Wind, which laſted three *Days* more; but afterwards we had it more *variable* than is uſual in that Place of the Sea.

The 28th we made *Deſeada*, a ſmall high Iſland, about a *League* in Length, and as much in Breadth: It is full of Trees, but uninhabited. Next Morning we were betwixt *Antegoa* and *Montſerat*, belonging to the *Engliſh*: Their Product is Sugar and Tobacco. We were in the Afternoon cloſe by *Redonda*, a ſmall Rock about a *Mile* long, inhabited only by *Noddies* and *Boobies*. When we were ſome *Leagues* from *Redonda*, we ſaw at the ſame time *Antegoa*, *Montſerat*, *Redonda*, *Nieves*, *St. Chriſtopher*'s, and *Statia*.

The next Day (which was the 30th) we came in Sight of *Santa Cruz*, belonging to the *Spaniards*.

Oct. 2. We came into *Crab-Iſland*, and ſent ſome of our People aſhore, and took *Poſſeſſion* of it in the *Company*'s Name.

Oct. 4. We ſtood to the *Leeward*, hearing there was a Harbour there; and when we came we ſaw the *Danes* Colours flying on the Shore, for the Governor of *St. Thomas* (a ſmall Iſland belonging to the *Danes*, and a *Free Port*) had ſent 14 Men and a Captain to take Poſſeſſion of it in the King of *Denmark*'s Name: But we found that we had taken Poſſeſſion of the Place before they came from *St. Thomas*. They gave in their Proteſt, yet ſeemed to be glad enough of our Neighbourhood.

On the 8th we left this Place, and on the 17th made *Noſtra Signora della Popa*: We lay aſide there, along the Coaſt, until the 3d Day of *November*, generally loſing by Night what we had gained all Day. *Crab-Iſland* is about 6 *Leagues* long, and in ſome Places 5 broad: The Soil is very good: It is all full of *Trees*. All the South-ſide is full of Bays very fit for anchoring in, but the beſt of all is to the *Leeward*, where the *Dane* hoiſted his Colours. It is called *Crab-Iſland* from the Multitude of *Land Crabs* there.

Nov. 3. We anchored before *Golden-Iſland*, and ſent in our Pinace to the Bay. The Natives had hoiſted a white Flag in Sign of Peace, and told us a great many Stories of Capt, *Swan*, Capt. *Davis*, and others; for they took us for *Engliſh*, by reaſon of our red *Fly*; but we took no Notice of the Men they named. At laſt they aſked us our Buſineſs: We told them, we deſigned to ſettle among them, and to be their Friends. They told us, we were very welcome, and that by *Prediction* they had expected us theſe *two Years*; for they ſay, that *two Years* ago it was foretold them, That a People ſhould come and live amongſt them, that would treat them civilly, and teach them good Manners. We converſed ſome time with them, and, after viewing the *Harbour*, we came aboard.

The 4th, we came into the *Harbour* of *Caledonia*: It is a moſt excellent one, for it is about a *League* in Length from N. W. to S. E. It is about *half* a *Mile* broad at the Mouth, and in ſome Places a *Mile* and more farther in. It is large enough to contain 500 *Sail* of Ships. The greateſt Part of it is *Land-lock'd*, ſo that it is ſafe, and cannot be touched by any Wind that can blow: The *Harbour* and the *Sea* make the Land that lies betwixt them a *Peninſula*. There is a Point of the *Peninſula* at the Mouth of the

Harbour, that may be fortified againſt a Navy. This Point ſecures the *Harbour*, ſo that no Ship can enter but muſt be within Reach of their Guns. It likewiſe defends *half* of the *Peninſula*; for no Guns from the other Side of the *Harbour* can touch it, and no Ship, carrying Guns, dares enter, for the *Breaſt-work* at the Point. The other Side of the *Peninſula* is either a Precipice, or defended againſt Ships by *Shoals* and *Breaches*; ſo that there remains only the narrow Neck that is not naturally *fortified*. In ſhort, it may be made impregnable; and there is Ground enough within it, if it were all cultivated, to afford 10000 Hogſheads of *Sugar* every Year. The *Soil* is rich; the *Air* good and temperate; the *Water* is ſweet; and every thing contributes to make it healthful and convenient. The *Product* of this Place, I mean in the *Harbour* and *Creeks* hereabouts, is *Turtle*, *Manatee*, and a vaſt Variety of very good ſmall *Fiſh*, from the Bigneſs of a *Salmon* to that of a *Perch*. The *Land* affords *Monkeys* of different Sorts, *Wild Deer*, *Indian Rabbets*, *Wild Hogs*, *Parrots* of many Kinds, *Parakites*, *Macaws*, *Pelicans*, and an hundred more *Birds* we have got no Name for. There are, moreover, *Land-Crabs*, *Souldiers*, *Land-Turtles*, *Lizards*, *Guanbas*, *Cock-Lizards*, and *Scorpions*: I had almoſt forgot *Partridges*, *Pheaſants*, and a kind of *Turkey*. All the *Birds* in this Country are beautiful, but none of them, that I could obſerve, have any *Notes*. We have a *Monkey* aboard that chirms like a *Lark*; it will never be bigger than a *Rat*. This Place affords Legions of *monſtrous Plants*, enough to confound all the Methods of *Botany* ever hitherto thought upon: Some of their *Leaves* exceed *three Ells* in Length, and are very broad. Beſides theſe *Monſters*, reducible to no *Tribe*, there are here a great many of the *European* Kindred (but ſtill ſomething odd about them) as *Lingua Cervina* of different Kinds, *Polypodium*, ſeveral of the *Plantæ Papilionaceæ*, *Muſci*, *Fungi*, *Convolvuli*, and a great many more I cannot now remember.

Now come we to their *People*. The *Men* are generally very civil and ſagacious, have all of them good Faces, are of low Stature, but very well built: They are of a Copper-colour, and have black Hair. They uſed to go naked, but are now as well cloathed as ourſelves: They wear a *Plate* of *Gold* in their *Noſe*, and a great many Rows of *Beads* about their *Neck* and *Wriſts*.

The *Women* are generally the moſt pitiful-like Things that ever Man ſaw. Their *Habit* differs from the *Men*, for they ordinarily wear a *Ring* in their *Noſe*: They have *Petticoats*, and a *Veil* over their *Face*. They are under no formal *Government*, but every Captain commands his own *River*, *Bay*, or *Iſland*, where he lives. The greateſt of them all is one Captain *Ambroſio*: He commands, particularly, the Country about the *Caballoes Point*, and, when he pleaſes, he can levy all the Men betwixt that and the *Gulf*, about 20 *Leagues*. There is another, Captain *Pedro*, that lives in the Houſe with *Ambroſio*, and is his Nephew and Son-in-law. There is a third, Captain *Andreas*, that commands the *River das Armas*; a fourth, Captain *Brandy*, that commands about the *Golden Iſland*; a fifth, Captain *Andreas*, that commands the Country adjoining to our Settlement; and a ſixth, Captain *Pedro*, his Conſort; a ſeventh, Captain *Pacigo*, who commands at *Carret Bay*; and Captain *Diego*, that commands the *Gulf*: *Ambroſio* ſeems to be the greateſt, and *Diego* next; both old Men.

There is no ſuch thing as a *King* or *Emperor* of *Darien*, nor, ſo far as we can gather from all the chief Men hereabout, has been theſe 40 or 50 *Years*.

This Country certainly affords *Gold* enough; for beſides that the Natives conſtantly aſſure us that they know ſeveral *Gold Mines* on this Side; beſides that, I ſay, the *Plates* they wear in their *Noſes*, and the Quantity of *Gold* that is amongſt them, is enough to perſuade any Man of the Truth of it. There were one Night aboard here ſome *Indians* that had an *hundred Ounces* of *Gold* about them. We are certainly much bound to Providence in this Affair; for as we were ſearching for the Place we were directed to, we found this: And though the Privateers had been ſo often at *Golden Iſland*, and though *Engliſh*, *Dutch*, and *French*, had been all over this Coaſt, from *Portobello* to *Cartagena*, yet never one of them made the Diſcovery; even the *Spaniards* themſelves never knew of this Place.

Obſervations in Mexico; *by* .... *n.* 130. *p.* 758.

XV. There were formerly near 80 *Towns* ſeated round about the *Lake* of *Mexico*, ſome of which contained 5000 *Families*, and ſome above 10000. At the preſent there may be a matter of 30 *Boroughs* and *Villages*, of which the greateſt holds not above 500 *Houſes*; all the reſt having been ruined by the *Revolutions* in that Country.

Obſervations in New-England; *by Mr.* J. Winthrop. *n.* 57. *p.* 1151.

XVI. 1. There are in *New-England*, in the Inland Country, whole *Foreſts* of a Sort of *Dwarf Oak*, which, though low and ſlender, yet bears *Acorns*. The Huſbandmen find that Sort of Land moſt difficult to break up at firſt with their Plough, in regard that the whole Surface is filled with ſpreading ſtrong Roots of this Sort of *Oak*. Neither muſt it be thought, that they are ſmall Shoots, which in time would grow big Trees; for where theſe grow, there are no great *Oaks*, or very few, amongſt them. I have obſerved that in ſome Plains, full of theſe *Shrubs*, there have been no *Acorns* on moſt of them; but whether in other Years they were not fruitful, I knew not. Some Years we know, even the great *Oaks* bear no Fruit, which are very full at other times.

Upon the *Bark* of a certain Tree growing in *Nova Scotia*, and (as I hear) in the more eaſterly Parts of *New-England*, there are little Knobs, within which there is a liquid Matter like *Turpentine* (which will run out, the Knob being cut open) of a very *ſanative* Nature, as I am credibly informed.

The *Pods* of *Silk-Graſs* are full of a kind of moſt fine *Down*, like *Cotton-Wool*, many ſuch Flocks in one and the ſame *Pod* ending in a flat Seed. It is uſed to ſtuff up Pillows and Cuſhions. Being tried to ſpin, it proves not ſtrong enough.

The *Down* alſo of the *Cotton-Tree* is not fit to *ſpin*: Theſe Trees grow high and big: At the Bottom of ſome of the *Leaves*, next to the Stalk of them, is a Knob, which is hollow, and a certain *Fly*, ſomewhat like a *Piſmire-Fly*, is bred therein.

Thoſe *Shells*, of which the *Indians* make the *White Wampan-peage*, one Sort of their *Money*, are bred in *Matrices* growing on the Bottom of Sea-bays. They are like *Periwinkles*, but greater. Whilſt they are very ſmall, and firſt growing, many of them are within one of the concave Receptacles of theſe *Matrices*, which are very tough and ſtrong, ſo contrived, that they are ſeparate from one another, yet ſo, that each of them is faſtened to a kind of *Skin*, ſubtended all along to all theſe *Caſes* or *Bags*.

2. The *Plague of the Back* is greatly diſtant from an *Empyema*. It ſeems more of a *Colick*, yet is undoubtedly a *nervous Dolour*. The Country-people have learned of the *Indians* to ſteep *Caſtoreum* in *Rum*, and ſo *cure* it.

By Mr. Benjamin Bullivant. n. 240. p. 167.

As to the *Fire-Flies*, I took ſeveral of them in *July*, 1697. I take them to be a *Glow-worm Volant*; the *Luſtre* is placed as in a *Glow-worm*. Kill the *Fly* (as I have done) and you'll find the *Scintilla*, a ſmall Gelly-like Subſtance, the which ſeparated into Atoms, gives ſtill, in the Dark, a *Luſtre* proportionable to the Magnitude of each Atom.

I ſaw *Butterflies Eggs* that were *teſtaceous*, and near as big as a *Wren*'s, moſt gloriouſly *beſtudded* with Gold and Silver: At *Rhode-Iſland* the Mowers find them in the *Graſs*, and they hatch in the Windows, and are a Sport for Children.

Tortoiſes are *amphibious*; I have found their *Eggs* by Ponds-ſides in great Quantities: They are without *Shells*, like thoſe in a *Hen's Belly*; our Dames ſcruple not to uſe them as *Hens Eggs* in Puddings.

Graſhoppers in dry Years are a Plague to the Huſbandmen; that on ſome Iſlands they have put Multitudes of *Turkeys* to deſtroy them: They are prodigious in Quantity, of a grey Colour, and about 3 *Inches* long; in *July* become *Volant*, and have a kind of *Regimental* Diſcipline, and as it were, ſome *Commanders*, which ſhew greater and more ſplendid *Wings* than the *Commoners*, and riſe firſt when they are purſued by the Fowls, or by the Foot of the Traveller.

The *Hum-Bird* I have ſhot with Sand, and had one ſome Weeks in my keeping. I put a Straw for a Perch into a *Venice* Glaſs Tumbler, tied over the Mouth with a Paper, in which I cut Holes for the Bird's Bill (about as long and as ſmall as a Taylor's Needle); and laying the Glaſs on one ſide, ſet a *Drachm* of *Honey* by it, which it ſoon ſcented, and with its long Tongue, put forth beyond its Bill, fed daily; it muted the *Honey* pure.

We have a *Frog* as big as a Peny-Loaf: Its *Cry* is exactly like that of a *Bull*. I have examined the *Clam*; he hath a *plain Pipe* or *Proboſcis*, from whence he ejects Water, if compreſſed.

The Advantage of Virginia *for* building Ships; *by* .. ....*n.* 93 *p.* 6015.

XVII. *Virginia* abounds all over, 1. With large tall *Oaks* of at leaſt 50 or 60 *Feet* in Height of clear Timber, without Boughs or Branching, being very fit to make *Plank* of any Size, very tough, and excellently well enduring the Water.

2. With Abundance of *Pines* for *Maſts*; and with another ſort of Wood, called *Cypreſs*, which is far better than any *Pine* for *Maſts*, it being of as tough and ſpringy a Nature as *Yew Tree*, bending beyond Credit; when *dry* much lighter than *Fir*; and ſo well laſting in *wet* and *dry*, that it ſeems rather to poliſh than periſh in the Weather.

3. With *Old Pines* for making of *Reſin*, *Pitch*, and *Tar*.

4. With the Conveniency of Planting *Hemp* for *Cordage* and *Sail-Cloths*.

5. With great Plenty of *Iron-Stone*, which hath been tried and found very good; the Conveniency of *Wood* and *Lime-Stone* being a good Inducement to the *making* of *Iron*, which might be done at a much cheaper Rate there than in *England*.

An Account of Virginia; *by Mr.* Tho. Glover. *n.* 126. *p.* 623.

XVIII. *Virginia* being a Part of the Continent of *America*, is diſtant from the *Lizard*, or *Lands End* of *England* 1000 *Leagues*, and is bounded on the *Eaſt* with the main *Ocean*, on the *Weſt* with the *Appal-lean* Mountains, on the *North* with *De-la-ware's Bay* and *River*, and on the *South* with the River of *Roanoak:* The Country lieth within a Bay called the Bay of *Chiſepeck*; The Mouth or Entrance whereinto is due *Weſt*, being about 6 *Leagues* in Breadth, and runneth up into the Country *North* and by *Eaſt* about 100 *Leagues*, continuing the forementioned Breadth a great Part of the Way, but narroweth by Degrees towards the upper End about one half. The Water in the *Channel* is for the moſt Part 9 *Fathoms*, but in ſome Places not above 7. The *Southermoſt Cape* of this *Bay* lieth in 37 *Deg.* and odd *Min.* North Latitude; and within the ſame are divers little Iſlands, upon ſome of which there are Plantations.

Into this *Bay* do iſſue ſo many large, pleaſant and commodious Rivers, as I verily believe no Space of Ground of equal Dimenſions in the whole World can boaſt of the like: The moſt eminent of theſe are *James River*, *York*, *Rapahannock*, *Potomack*, *Potuxen*, and *Choptanck*; the four laſt retain their *Indian* Names. At the *Head* of the *Bay* do enter 3 large Rivers; one whereof is called *Suſ-cahannah*, from a Nation of *Indians* ſo called, bordering on the ſame. Beſides theſe, there are twice as many as navigable as theſe, but by reaſon they run not above 30 or 40 *Miles*, I ſhall forbear inſerting any of their Names.

Potomock, the largeſt of all the reſt, is at the Mouth 10 *Miles* broad, and continueth that Breadth for 20 *Miles* up; from which Place it is 6 *Miles* broad, and continueth that Breadth for 30 *Miles* higher, and is in Length about 200 *Miles*. This River lieth about the Middle of the *Bay*; the other Rivers, whoſe Names are here inſerted, are moſt of them 2 *Leagues* broad at the Mouth, and ſome of them 150, others 120 *Miles* in Length.

The *Tides* are ſcarce diſcernible, when the Winds hold at *North-Weſt*; but at other Times they flow as they do in *England*, only they appear not ſo large; the Reaſon whereof may be, becauſe the *Tide* diffuſeth itſelf into ſo many ſpacious Rivers.

In the Rivers are great Plenty and Variety of delicate *Fiſh*; one Kind whereof is by the *Engliſh* call'd a *Sheep's Head*, from the Reſemblance the Eye of it bears with the Eye of a *Sheep*: This *Fiſh* is generally about 15 or 16 *Inches* long, and about *half* a *Foot* broad; it is a wholſome and pleaſant *Fiſh*, and of eaſy Digeſtion.

There is another Sort, which the *Engliſh* call a *Drum*; many of which are 2 *Foot* and a *half*, or 3 *Foot* long. This is likewiſe a very good Fiſh, and there is great Plenty of them. In the Head of this Fiſh there is a Gelly, which, being taken out and dried in the Sun, then beaten to Powder and given in Broth, procureth ſpeedy *Delivery* to *Women in Labour*.

At the Heads of the *Rivers* there are *Sturgeon*, and in the *Creeks* are great Store of ſmall *Fiſh*, as *Perches*, *Crokers*, *Taylors*, *Eels*, and divers others whoſe Names I know not. Here are ſuch Plenty of *Oyſters*, as they may load Ships with them. At the Mouth of *Elizabeth* River, when it is Low-water, they appear in Rocks a Foot above Water. There are alſo in ſome Places great Store of *Muſſels* and *Cockles*; there is alſo a *Fiſh* called a *Sting Ray*, which much reſembles a *Skate*, only on one Side of his *Tail* grows out a ſharp Bone, like a Bodkin, about 4 or 5 *Inches* long, with which he ſtrikes and wounds other *Fiſh*, and then preys upon them.

About a Year before I came out of the Country, as I was coming down *Rapahannock* River in a Sloop bound for the *Bay*, 3 *Leagues* ſhort of the River's Mouth, being left alone in the *Sloop*, I heard a great Ruſhing and Flaſhing of the Water, which cauſed me ſuddenly to look up, and about half a Stone's Caſt from me appeared a moſt prodigious Creature, much reſembling a *Man*, only ſomewhat larger, ſtanding right up in the Water, with his Head, Neck, Shoulders, Breaſt and Waiſt, to the Cubits of his Arms, above Water. His Skin was tawny, much like that of an *Indian*; the Figure of his *Head* was *pyramidal*, and ſlick, without *Hair*: his *Eyes* large and black, and ſo were his *Eye-brows*; his Mouth very wide, with a broad black Streak on the *Upper Lip*, which turned upwards at each End like Muſtachoes; his *Countenance* was grim and terrible; his *Neck*, *Shoulders*, *Arms*, *Breaſt* and *Waiſt* were like unto the Neck, Shoulders, Arms, Breaſt and Waiſt of a *Man*; his *Hands*, if he had any, were under Water; he ſeemed to ſtand with his *Eyes* fixed on me for ſome Time, and afterward dived down, and a little after he roſe at ſomewhat a farther Diſtance, and turned his *Head* toward me again, and then immediately falleth a little under Water, and ſwimmeth away ſo near the Top of the Water, that I could diſcern him throw out his *Arms*, and gather them in, as a *Man* doth when he *ſwimmeth*. At laſt he ſhoots with his Head downwards, by which means he caſt his Tail above the Water, which exactly reſembled the *Tail* of a *Fiſh*, with a broad *Fin* at the End of it.

On the *Bay* and *Rivers* feed ſo many *Wild Fowl*, as in Winter-time they do in ſome Places cover the Water for two *Miles*; the chief of which are wild *Swans*, and *Geeſe*, *Cormorants*, *Brants*, *Shield-fowl*, *Duck* and *Mallard*, *Teal*, *Wigeons*, with many others.

There likewiſe keep in the *Rivers*, *Bevers* and *Otters*: The *Bevers* have their Teeth ſo ſtrong and ſharp, that they gnaw down Trees, wherewith they make *Damms* croſs the Waters, under which they keep, which are uſually called *Bever Damms*, and in ſome Places ſerve in the room of *Foot-bridges*.

The original Springs, that make all theſe *Rivers*, ariſe at the *Foot* of the *Appal-lean Mountains*; but the *Cataracts*, or *Falls*, of theſe Rivers are 60 or 70 *Miles* diſtant from the *Mountains*.

Theſe *Mountains* have their Beginning Northward at the Lake of *Canada*, and run all along the Back of the Country to the South-Weſt as far as the Lake *Uſherre*, which is ſome *Hundreds* of *Leagues*.

There was one Col. *Catlet*, that was a good Mathematician, who with ſome other Gentlemen took a Journey to make ſome further Diſcoveries of the Country to the Weſtward; and arriving at the *Foot* of the *Mountains* early in the Morning, they left their Horſes, and endeavoured to gain the *Tops* of the *Mountains*, which they accompliſhed about 4 of the Clock in the Afternoon; and then looking further forward, they diſcovered other *Mountains*, whereof they took the *Altitude*, and judged them inacceſſible; which diſcouraged them from any further Attempts.

Above 5 Years ſince there was a *German* Chirurgeon, who obtained a Commiſſion from Sir *Will. Bartlet* to travel to the *South-Weſt* of *Virginia*, and to make Diſcovery of thoſe Parts. He went along the *Foot* of the *Mountains* as far as the Lake *Uſherre*, and diſcovered them to be paſſable in two Places; and he gives a Relation, that while he was in an *Indian* Town adjacent to the *Mountains*, there came 4 *Indians* on an Embaſſy to the King of that Town, from a King that lived on the other Side of the *Mountains*.

At his Return he brought an *Emerald* and ſome *Spaniſh Money*, which he ſaid he had of the *Indians* bordering on the *Lake* of *Uſherre*; which cauſed ſome to think that ſome *Spaniards* are ſeated near upon the Back of theſe *Mountains*.

The Shores all along the *Bay* and *Rivers* are for the moſt part *ſandy*, but only in ſome Points there is ſome *Shingle* caſt up; but the *Earth* affordeth very few *Stones*, and thoſe that are there, are almoſt all of them hard and tranſparent. I have taken up ſeveral *Stones*, that would cut Glaſs as well as any *Diamond*: And I do verily think, that there are ſome *Stones* gathered there, that do abate the Price of *Diamonds*; for I have ſeen ſeveral Rings of *Virginia-Stones*, which in my Judgment have equal'd *Diamonds* in *Luſtre*.

The Cliffs of all the Rivers are full of great Veins of *Iron-Mine*; and in ſome Places of the Country I have ſeen Rocks of the ſame to lie a *Foot* above the Earth; and generally all the Highlands under the Mould are a mere Rock of *Iron:* But an *Iron-work* would coſt 3000 *l.* and the Country being generally poor, they were diſcouraged from *running* this *Mineral*, by reaſon of the Charge; though I believe the true Reaſon is, their being ſo intent on their *Tobacco Plantations*, that they neglect all other more noble and advantageous Improvements.

They diſtinguiſh their *Soil* into three Sorts, *viz. High*, *Low*, and *Marſhy* Land; all which have ſome *Sand* mixed in them, that makes their Land warmer than ours in *England.* Their *High Lands* are moſt *ſandy*, but do, notwithſtanding, bear very good Crops of *Tobacco*; only it does not hold its Strength ſo long as the *Low Ground*, which is very rich, being a blackiſh Mould, about a *Foot* deep, or ſomewhat more, and will hold its Strength for ſeven or eight Crops ſucceſſively, without *manuring*. Their *Marſh Lands* bear Sedges and Ruſhes, after the Manner of ours; and of theſe they have not endeavoured any Improvement, as yet. Their Land in general is as good and fertile as the Land of *England.* When the Strength of their Ground is worn out, they never *manure* it to bring it in Heart, but let it lie for Paſture for all Mens Cattle to graze upon, and *clear* more Ground out of the Woods to *plant in.*

As to the *Timber* of this Country, there are divers Kinds; four ſeveral Sorts of *Oak*, very tall and ſmooth. There is alſo another Sort of *Timber*, called *Hickery*, that is harder than any *Oak.* There are alſo very large and tall *Poplars*, and, in ſome Parts of the Country, great Store of *Pines*, fit for *Maſts* of *Ships.* There is likewiſe *black Walnut*, *Cypreſs*, *Cedar*, *Dogwood*, *Aſh*, *Elm*, *Gum-tree*, *Locuſt*, *Cheſnut*, *Haſel*, *Saſſafras*, *Holly*, *Elder*, with ſeveral others.

As to the *Fruit-trees* of the Country, it affords great Plenty; for there are few *Planters* but what have fair and large *Orchards*, ſome whereof have 1200 Trees, and upward, bearing all Sorts of *Engliſh Apples*; as *Pearmains*, *Pippins*, *Ruſſetins*, *Coſtards*, *Marigolds*, *Kings-apples*, *Magitens*, *Batchelors*, and many others; of which they make great Store of *Cyder.*

Here are likewiſe great *Peach-Orchards*, which bear ſuch an infinite Quantity of *Peaches*, that at ſome *Plantations* they beat down to the *Hogs* forty *Buſhels* in a *Year.*

Here are alſo great Store of *Quinces*, which are larger and fairer than thoſe of *England*, and not ſo harſh in Taſte: Of the Juice of theſe they make alſo *Quince-drink.*

Here are likewiſe *Apricocks*, and ſome ſort of *Engliſh Plumbs*, but theſe do not ripen ſo kindly as they do in *England.*

There are ſome ſort of *Pears*, but at very few *Plantations*; I have ſeen the *Bergamy*, *Warden*, and two or three other Sorts, and theſe are as fair, large, and pleaſant, as they are in *England.*

Here grow as good *Figs* as there do in *Spain*, but there are few planted as yet.

Thoſe that take the Pains to plant *Gooſeberries*, have them; but I never ſaw any of our *Engliſh Currants (Ribberies)* there; and it is obſerved, that *Oranges* and *Lemons* will not grow there, though they do in more Northern Countries.

I had almoſt forgot to mention their *Mulberry-trees*, whereof they have had good Store about their Houſes: Theſe were planted at firſt to feed *Silk-worms*, but that Deſign failing, they are now of little Uſe amongſt them.

The meaneſt *Planter* hath Store of *Cherries*, and they are all over *Virginia* as plentiful as they are in *Kent*. The *Cherry-trees* grow more *large* generally than they do in *England*, and bear more plentifully, without any Pains-taking of *digging* about them, or *pruning* them.

There groweth wild in ſome Places of the Woods, a *Plumb* ſomewhat like our *White Plumb*, but it doth exceed it, being much more ſucculent.

In the Woods there are abundance of *Vines*, which twine about all the *Oaks* and *Poplars*, and run up to the Top of them: Theſe bear a kind of *Claret Grapes*, of which ſome few of the *Planters* do make *Wine*, whereof I have taſted: It is ſomewhat ſmaller than *French Claret*; but I ſuppoſe, if ſome of theſe *Vines* were planted in convenient *Vineyards*, where the Sun might have a more kindly Influence upon them, and kept with Diligence and ſeaſonable *Pruning*, they might afford as good *Grapes* as the *Claret-Grapes* of *France* are.

There is alſo in the Woods a little *Shrub*, which beareth a *Berry* like our *Elder-Berry*, and is a very pleaſant *Berry* to eat.

Here is a Tree called a *Chincopine*, which is like a *Cheſnut*, with a *burry Huſk*, but leſs by far.

Their *Gardens* have all Sorts of *Engliſh Pot-herbs* and *Salads*; they have *Cabbages*, *Coleworts*, *Colliflowers*, *Parſneps*, *Carrots*, *Potatoes*, and *Yams*; and ſuch *Herbs* as grow wild in *England*, and do not grow there, they plant; as *Wormwood*, *Fetherfew*, *Houſeleek*, *Carduus Benedictus*, *Rue*, *Coriander*, *Enula*, and the like.

They have likewiſe, in their *Gardens*, *Roſes*, *Clove-Gilliflowers*, and Variety of other Sorts of *Flowers*.

There grow wild in the Woods, *Plantane* of all Sorts, *Yellow-Dock*, *Burdock*, *Solomons-Seal*, *Egrimony*, *Centaury*, *Scabious*, *Groundſel*, *Dwarf Elder*, *Yarrow*, *Purſlane*, and *White Maidenhair*, the beſt that ever I ſaw. Upon the Sides of the Hills, *Aſarum*, and on the Bay-ſide, *Soldanella*, or *Sea-Scurvygraſs*, in great Plenty. Here groweth the *Radix Serpentaria Nigra*, which was ſo much uſed in the laſt great *Peſtilence*, that the Price of it advanced from ten *Shillings* to three *Pounds Sterling* a *Pound*. Here is alſo an *Herb* which ſome call *Dittany*, others *Pepperwort*; it is not *Dittany* of *Candia*, nor *Engliſh Dittander*: It groweth a *Foot* or a *Foot* and *half* high; the *Leaves* are about the Breadth of a Groat, and figured like a *Heart*, and ſhoot out of the *Stalk* and *Branches* one of a Side, directly oppoſite to each other: It ſmelleth hot like *Pepper*, and biteth upon the Tongue. The *Water* of this Herb *diſtilled* out of a *Limbeck*, is one of the beſt Things I know to drive *Worms* out of the Body; and an *Ounce* of this *Water* taken, provoketh *Sweat* plentifully.

Here grow two Roots, which ſome Phyſicians judge, the one to be *Turbith*, the other *Mechoacan*; but whether they be the right, or no, I could not well judge. Both theſe Roots are *purging*, and in their Operations much like thoſe we have at the *Apothecaries*, only ſomewhat more forcible; the Reaſon may be, becauſe there we have them more new and *ſucculent*.

Here groweth a Plant about a *Foot* and a *half*, or *two Foot* in Height; the *Leaves* are rugged like to a *Borage* Leaf, but they are longer, and not above two *Fingers* broad: About the *Stalk*, where the *Leaves* grow out, there hang *Berries*, which, being ripe, are *yellow*; the *Engliſh* call it the *Fever* and *Ague-Root*. This Root being newly taken out of the Ground, and a *Drachm* and a *half* of it infuſed in Beer or Water the Space of twelve *Hours*, *purgeth* downwards with ſome Violence; but I have given a *Drachm* of the *Root* in Powder, and then it only moveth *Sweat*, and that but moderately. It is a little *bitter* in Taſte, and therefore ſomewhat hot.

All that the Inhabitants give their *Cattle* in Winter is, only the Husks of their *Indian Corn*, unleſs it be ſome of them that have a little *Wheat* Straw; neither do they give them any more of theſe than will ſerve to keep them alive; by reaſon whereof they venture into the *marſhy* Grounds and *Swamps* for Food, where very many are *loſt*.

They have as great Plenty of *Horſes*, and as good, as we have in *England*.

As to their *Sheep*, they keep but few, being diſcouraged by the *Wolves*, which are all over the Country, and do much Miſchief amongſt their Flocks.

In the *Woods* are great ſtore of *Deer*, and ſome *Rabbets*, which are generally miſtaken for *Hares*.

There are alſo ſeveral Sorts of *ravenous Beaſts*, as *Wolves*, *Racoons*, *Wild Cats*, *Poſſums*, *Monacks*, *Flying Squirrels*, with two other Sorts; and in the Northernmoſt Parts of the Country ſome *Bears*.

The *Fowls* that keep the *Woods* are, *Wild Turkeys*, *Turkey-Buzzards*, *Turtle-Doves*, *Partridges*, *Hawks* of ſeveral Sorts, with many others, of leſs Note.

There are alſo divers Kinds of *ſmall Birds*, whereof the *Mocking-Bird*, the *Red-Bird*, and *Humming-Bird*, are the moſt remarkable; the firſt for *Variety* and *Sweetneſs* of *Notes*, the ſecond for his *Colour*, and the laſt for the *Smalneſs* of his Body. As to the *Mocking-Bird*, beſides his own natural *Notes*, which are many and pleaſant, he *imitateth* all the *Birds* in the *Woods*, from whence he takes his Name; he *ſingeth* not only in the Day, but alſo at all Hours in the Night, on the Tops of the Chimneys; he is ſtrangely antick in his *Flying*, ſometimes fluttering in the Air with his Head right down and Tail up, other times with his Tail down and Head up: Being kept tame, he is very docible. The *Red-Bird*, as I hinted before, taketh his Name from the *Colour*, being all over of a pure *Blood-Red*. The *Humming-Bird* taketh his Name from the *Noiſe* he makes in *flying*; this is of divers *Colours*, and not much bigger than a *Hornet*, and yet hath all the Parts of a *Bird* intire.

There are five or ſix Sorts of *Snakes*, amongſt which the *Rattle-Snake* is moſt remarkable, being about the Bigneſs of a Man's Leg, and for the moſt part, about a *Yard* and a *half* long; he hath a *Rattle* at the End of his *Tail*, wherewith he maketh a *Noiſe* when any one approacheth nigh him, which ſeemeth to be a peculiar *Providence* of *God* to warn People to avoid the Danger: For this Creature is ſo *venomous*, that the Bite of it is of moſt dangerous Conſequence, unleſs they ſpeedily make uſe of the proper *Antidote*. There are alſo long *black Snakes*, ſhort and thick *black Snakes*; this latter Sort oftentimes *ſucks* the *Cows*, and cauſes them to give *bloody Milk*. There is another Sort called the *Corn-Snake*, becauſe he is uſually found in *Corn-fields*; this is near as big as the *Rattle-Snake*. There are alſo ſome other Sorts of *Land-Snakes*, all of which are more or leſs *venomous*; beſides, there are very many *Water-Snakes*, that keep the *Springs* and *Rivers*.

The *Indians* are generally well-proportioned, as to their *Stature*, being ſomewhat tall, but no ways corpulent; their Hair black, uſually hanging right down; their Eyes alſo black, and their Skin tawny, inclining to Blackiſhneſs: They live together in *Towns*, and every *Town* is under a ſeveral *King*. At the firſt coming of the *Engliſh*, divers *Towns* had 2 or 3000 *Bow-men* in them; but now, in the ſouthern Parts of *Virginia*, the biggeſt *Indian Town* hath not above 500 *Inhabitants*: Many *Towns* have ſcarce 60 *Bow-men* in them, and in one *Town* there are not above 20; and they are ſo univerſally thinned in the forementioned ſouthern Parts, that I verily believe there are not above 3000 left under the whole Government of Sir *William Bartlett*; but in my Lord of *Baltimore*'s Territories, at the *Head* of the *Bay*, where the *Engliſh* were later ſeated, they are more numerous, there being ſtill in ſome *Towns* about 3000 *Indians*: But theſe being in continual Wars with each other, are like, ſhortly, to be reduced to as ſmall Numbers as the former.

Inſtead of *Cloaths*, they wear a *Deer-ſkin*, tucked about their Middle, and another about their Shoulders; and for *Shoes*, they have Pieces of *Deerſkins* tied about their *Feet*.

Their Habitations are *Cabbins*, about nine or ten *Foot* high, which are made after this Manner: They fix *Poles* into the Ground, and bring the Tops of them one with another, and ſo tie them together; the Outſide of theſe *Poles* they line with *Bark*, to defend them from the Injuries of the *Weather*, but they leave a Hole on the Top, right in the Middle of the *Cabbin*, for the *Smoak* to go out. Round the Inſide of their *Cabbins* they have *Banks* of *Earth* caſt up, which ſerve inſtead of *Stools* and *Beds*. They have no kind of *Houſhold-ſtuff* but *earthen Pots*, *wooden Bowls*, and thin *Mats* to lie on; all which they make themſelves.

Their *Diet* is *Indian-Corn*, *Veniſon*, *Wild Turkeys*, *Oyſters*, and all Kinds of *Fiſh* the *Rivers* afford; and all Kind of *Wild Beaſts* of the *Woods*.

They are *prohibited* the keeping either *Cows*, *Sheep*, or *Hogs*, by the *Engliſh*; leſt they ſhould make bold with more than their own.

They did formerly *catch* their *Fiſh* after an odd Manner, before the *Engliſh* came amongſt them; which was thus: At the *Head* of their *Canoes* they fixed a Hearth, on which, in a dark Night, they would make a *Blaze* with *Fire* put to the Shivers of Pine-tree; and they would *paddle* their *Canoes* along the Shore in ſhoal Water; the *Fiſh* ſeeing the *Light*, would come as thick as they could ſwim by each other, about the *Heads* of the *Canoes*; then with Sticks, that were pointed very ſharp at the Ends, they would ſtrike through them, and lift them up into the *Canoe:* But now they have learned of the *Engliſh* to catch *Fiſh* with *Hook* and *Line*, and ſometimes the *Engliſh* do uſe their Way in dark Nights, only they ſtrike with an Inſtrument of Iron ſomewhat like *Mole-tines*.

They have *Prieſts*, which are generally thought to be *Conjurers*; for when they have great Want of *Rain*, one of their *Prieſts* will go into a private *Cabbin*, and, by his Invocations, will cauſe abundance to fall immediately, which they call *Making of Rain*.

They *offer* the *Firſt-fruits* of all things. The *firſt Deer* they kill, after hey are in *Seaſon*, they lay privately on the Head of a Tree near the Place where they killed it; and they ſay, no good Luck will befal them that Year, f they do not *offer* the *firſt* of every thing.

They *burn* the Bodies of the *Dead*, and ſew up the *Aſhes* in *Mats*, which hey place near the *Cabbins* of their *Relations*.

Some of them ſay, That the *God* of the *Engliſh* is a *good God*, and gives hem good Things; but their *God* is an *angry God*, and oftentimes beats hem.

Almoſt every *Town* differs in *Language*, and yet not any of their *Lan-uages* copious; as may be ſeen by their frequent expreſſing their Meaning to ach other by *Signs*.

Their *Money* is of *two* Sorts; *one* whereof is made of a *white* kind of *hell*, which, being divided into ſmall Parts, they put them on a *String*, fter the Manner of *Beads*; this they call *Peacke:* The other is of a *blue hell*, ordered in the ſame Manner, which they call *Rounda:* This laſt is the eaner Sort, about *Half* a *Yard* whereof is of equal Value with our *Nine-ence*. The *Chief* of the *Indians* do wear ſome of this on the *Deer-ſkins* out their Bodies, laid on like *Lace*.

They have nothing to *trade* with but *Deer-ſkins*, and ſome *Bever*, which ey exchange with the *Engliſh* for *Guns*, *Gunpowder*, *Shot*, and *Brandy*; ving nothing before but *Bows* and *Arrows*, wherewith they killed their *eer*, and other *wild Beaſts*.

They have no other Account of *Time*, but by the *Changes* of the *oon*.

Their *Winter* is uſually in *November*, *December*, and *January*.

They are very *revengeful*; for if any one chance to be *ſlain*, ſome of the *elations* of the ſlain Perſon will *kill* the *Murderer*, or ſome of his *Family*, ough it be two or three Generations after; having no *Juſtice* done amongſt em, in this reſpect, but what particular Perſons do themſelves, if that may ermed *Juſtice*.

The *Indians* being a rude Sort of People, uſe no Curioſity in preparing eir *Phyſick*; yet are they not ignorant of the Nature and Uſes of their

Plants, but they uſe no *Correctives* to take away the *flatuous*, *nauſeous*, and other bad *Qualities* of them.

Their uſual Way of *Cure* for moſt *inward Diſtempers* is by *Decoction*, which they make partly *pectoral*, partly *ſudorifick:* Theſe they cauſe the *Sick* to drink the Quantity of *half* a *Pint* at a time, two or three times a Day; but they give nothing to procure *Vomiting* in any *Diſtempers*, as a bad Omen that the *Diſeaſed* will *die*; neither did I ever know them to uſe any Ways of *Blooding* or *Cupping*.

If they have any *Wounds*, *Ulcers*, or *Fractures*, they have the Knowledge of *curing* them. I did once ſee an *Indian* whoſe Arm had been *broken*, and viewing the Place, I found the *Bones* to be as *ſmoothly conſolidated*, and as well *reduced*, as any *Engliſh Chirurgeon* could have done it.

All *Indians* carry a Powder about them to *cure* the *Bites* of *Snakes*, and in almoſt every *Town* this Powder hath a *different Compoſition*, and every Compoſition is certainly effectual to the correcting the Malignity of the *Venom*. Neither was it ever known to us, that any *Indian* ſuffered much Harm by theſe *Bites*, but in a Day's Time he would be as well as if he had never been *bitten:* Whereas ſome of the *Engliſh*, for want of a ſpeedy Remedy, have loſt their Lives.

The *Indians* are frequently troubled with violent *Colicks*, which oftentimes terminate in *Palſies*.

The Manner of *Planting* and *Ordering Tobacco* is thus: In the *twelve Days* they begin to *ſow* their Seed in *Beds* of fine Mould, and when the *Plants* be grown to the Breadth of a *Shilling*, they are fit to *replant* into the *Hills*; for in their *Plantations* they make ſmall *Hills* about four *Foot* diſtant from each other, ſomewhat after the Manner of our *Hop-yards:* Theſe *Hills* being prepared againſt the *Plants* be grown to the forementioned Bigneſs (which is about the Beginning of *May*), they then, in moiſt Weather, draw the Plants out of their Beds, and replant them in the *Hills*, which afterwards they keep with diligent *Weedings:* When the *Plant* hath put out ſo many *Leaves* as the Ground will nouriſh to a Subſtance and Largeneſs that will render them merchantable, then they take off the *Top* of the *Plant*; if the Ground be very rich, they let a *Plant* put out twelve or ſixteen *Le* before they *top* it; if mean, then not above nine or ten, and ſo according the Strength of their Soil: The *Top* being taken off, the Plant grows higher, but afterwards it will put out *Suckers* between their *Leaves*, whi they pluck away once a Week, till the *Plant* comes to Perfection, which doth in *Auguſt:* Then in dry Weather, when there is a little *Breeze* Wind, they cut down what is ripe, letting it lie about four *Hours* on Ground, till ſuch time as the *Leaves*, that ſtood ſtrutting out, fall down the Stalk; then they carry it on their Shoulders into their *Tobacco-hou* where other Servants taking of it, drive into the Stalk of each *Plant* a P and as faſt as they are pegg'd, they hang them up by the Pegs *Tobacco-ſticks*, ſo nigh each other, that they juſt touch, much after Manner they hang *Herrings* in *Yarmouth:* Thus they let them hang five ſix *Weeks*, till ſuch time as the *Stem* in the Middle of the *Leaf* will ſnap in

Bend

Bending of it; then, when the Air hath ſo moiſtened the *Leaf* as that it may be handled without breaking, they ſtrike it down, *ſtrip* it off the *Stalk*, bind it up in Bundles, and pack it into *Hogſheads* for Uſe.

Sometimes they are forced to *plant* their *Hills twice* or *thrice* over, by reaſon of an *Earth-worm* which eats the Root; and when the *Plant* is well grown, they ſuffer Damage by a *Worm* that devours the *Leaf*, called a *Horn-worm* (an *Eruca*, or *Caterpiller*), which is bred upon the *Leaf*; if theſe *Worms* be not carefully taken off, they will ſpoil the whole Crop.

In the *Year* 1667. in *Auguſt*, there happened all over *Virginia* a *Guſt*, or Storm of *Wind* and *Rain*, which continued for three *Days* with ſuch Violence, that the like was hardly ever heard of. It began, and continu'd blowing, at *Eaſt*, with ſuch Fierceneſs, that above one Half of the Crop of their *Tobacco*, which was then ſtanding in their Fields, was blown away, and torn apieces; the *Trees* in the *Woods*, all over the Country, were blown up by the *Roots* in innumerable Quantities: The *Waters* in the *Bay*, in ſome Places, were drove a great way into the *Woods*, and the greateſt Part of thoſe that houſed *Tobacco*, had their *Tobacco-houſes* blown down, and their *Tobacco* ſpoiled; ſo that there was not fully *one* Part of *three* ſaved of what would have been made that *Year*.

The *Planters Houſes* are built all along the *Sides* of the *Rivers*, for the Conveniency of Shipping: They *build* after the *Engliſh* Manner, *whiting* the Inſide of their *Houſes* with Morter made of *burnt Oyſter-ſhells* inſtead of *Lime*.

They have pure and wholſome *Water*, which they fetch wholly from *Springs*, whereof the Country is ſo full, that there is not a *Houſe* but hath one nigh the Door.

A Voyage to Virginia; *and an Account of that Country; by M^r. J.* Clapton. *n.* 201. *p.* 781.

XIX. The Veſſel in which we ſet Sail for *Virginia*, being about 200, or 250 *Tuns*, ſprung a conſiderable *Leak*: The Captain had tried all Methods, that Seamen uſe upon ſuch Occaſions, to find the *Leak*; particularly, they applied *Cans* to their Ears to hear with, but all in vain: The Working of the Ship, the Tackle, and the Sea, made ſuch a Noiſe, that they could diſcover nothing thereby. I then happily bethought myſelf of a *Speaking-trumpet* I had contrived for ſome other Conveniencies, of a differing Shape from the common Sorts: I bid him take it, and apply the broad End to the Side of the Ship, the narrow End to his Ear, and it would increaſe his Hearing as much as it augmented the Voice the other Way, and would ward the Ear too from the Confuſion of foreign Noiſe. Upon the firſt Application, accordingly, they heard it, though it happened to be at a conſiderable Diſtance; and when they removed the Trumpet nigher, they heard it as if it had been the Current of a mighty River: So that cutting there the *Cieling* of the Ship, they immediately ſtopped the *Leak*.

In the Sea I ſaw many little Things which the Seamen call *Carvels*; they are like a *Jelly*, or *Starch*, that is made with a Caſt of *Blue* in it; they ſwim like a ſmall Sheep's Bladder above the Water, downwards there are long *fibrous* Strings, ſome whereof I have found near *half* a *Yard* long. This

I take to be a Sort of *Sea Plant*, and the Strings its *Roots*, growing in the *Sea* as *Duck-weed* does in *Ponds*. It may be reckoned among the *Potential Cauteries*: For when we were one Day becalm'd, the ſportful People rubb'd it on one another's Hands and Faces, and where it touch'd it would make it look very *red*, and ſmart worſe than a *Nettle*. In my Return for *England* we ſtruck a *Hawksbill-turtle*, in whoſe Guts I found many of theſe *Carvels*; ſo that 'tis manifeſt they feed thereon.

The Air. The Cape call'd *Cape Henry* lies in 36½ of *North Latitude*. The *Air* and *Temperature* of the *Seaſons* is much govern'd by *Winds* in *Virginia*, both as to *Heat* and *Cold*, *Drineſs* and *Moiſture*, whoſe Variations are very notable, there being often great and ſudden Changes: The *North* and *North-weſt* are very *nitrous* and piercing, cold and clear, or elſe ſtormy; the *South-eaſt* and *South* hazy, and ſultry hot. Their *Winter* is a fine clear Air, and dry, which renders it very pleaſant; their *Froſts* are ſhort, but ſometimes ſo very ſharp, that it will freeze the *Rivers* over three *Miles* broad: Nay, the *Secretary of State* aſſured me, that it had frozen clever over *Potomack* River, over-againſt his Houſe, where 'tis near nine *Miles* broad. I have obſerved, it freezes there the hardeſt, when, from a moiſt *South-eaſt*, on a ſudden the *Wind* paſſing by the *North*, a *nitrous* ſharp *North-weſt Wind* blows, not with high Guſts, but with a cutting briſk Air; and thoſe Vales, that ſeem then to be ſhelter'd from the *Wind*, and lie warm, where the Air is moſt ſtagnant and moiſt, are *frozen* the hardeſt, and ſeized the ſooneſt; and there the *Fruits* are more ſubject to *blaſt*, than where the Air has a free Motion. *Snow* falls ſometimes in pretty Quantities, but rarely continues there above a Day or two. Their *Spring* is about a Month earlier than in *England*. In *April* they have frequent *Rains*, ſometimes ſeveral ſhort and ſudden Guſts; *May* and *June* the *Heat* increaſes, and it is much like our *Summer*, being mitigated with gentle *Breezes*, that riſe about nine o'Clock, and decreaſe and incline as the Sun riſes and falls: *July* and *Auguſt* thoſe *Breezes* ceaſe, and the Air becomes ſtagnant; ſo that the *Heat* is violent, and troubleſome. In *September* the *Weather* uſually *breaks* ſuddenly, and there fall, generally, very conſiderable *Rains*. When the *Weather breaks*, many fall *ſick*, this being the Time of an *epidemical Sickneſs*, for *Seaſonings*, *Cachexies*, *Fluxes*, *ſcorbutical Dropſies*, *Gripes*, or the like; which I have attributed to this Reaſon, That, by the extraordinary *Heat*, the Ferment of the *Blood* being raiſed too high, and the *Tone* of the *Stomach* relax'd; when the *Weather breaks*, the *Blood* palls, and, like over-fermented Liquors, is depauperated, or turns eager and ſharp, and there's a *crude Digeſtion*, whence the named *Diſtempers* may be ſuppoſed to enſue. And, for Confirmation, I have obſerved the *carminative Seeds*, ſuch as *warm*, and whoſe *Oil* ſheaths the *acid* Humours that ever reſult from *crude Digeſtions*; but *Decoctions* that retain the *Tone* of the *Stomach*, as I ſuppoſe, by making the little *Glands* in the *Tunicles* of the *Stomach* ſqueeze out their *Juice* (for what is *bitter* may be as well offenſive to the *Stomach* as to the *Palate*), and then *Chalybeates*, that raiſe the decayed Ferment, are no bad Practice; after which, I conceive, *Armoniack*

moniack Spirits might be very beneficial. It is wonderful to conſider what Influence the *Air* has over Mens Bodies, whereof I had myſelf ſad Aſſurances: For though I was in a very cloſe warm Room, where was a Fire conſtantly kept; yet there was not the leaſt Alteration or Change, whereof I was not ſenſible, when I was ſick of the *Gripes*. When a very ingenious Gentlewoman was viſited with the ſame Diſtemper, I had the Opportunity of making very conſiderable Obſervations. I ſtood at the Window, and could view the Clouds ariſe; for there ſmall black fleeting Clouds would ariſe, and be ſwiftly carried croſs the whole Element; and as theſe Clouds aroſe, and came nigher, her Torments were increaſed, which were grievous as a *Labouring Woman*'s: There was not the leaſt *Cloud* but lamentably affected her, and that at a conſiderable Diſtance; but by her Shrieks it ſeemed more or leſs, according to the Bigneſs or Nearneſs of the Clouds. The *Thunder* there is attended often with *fatal Circumſtances:* I was with my Lord *Howard* of *Effingham*, the Governor, when they brought Word that one Dr. *A.* was killed therewith, after this Manner: He was *ſmoaking* a *Pipe* of *Tobacco*, and looking out at his Window, when he was ſtruck *dead*, and immediately became ſo *ſtiff*, that he did not fall, but ſtood leaning in the *Window*, with the *Pipe* in his *Mouth*, in the ſame *Poſture* he was in when ſtruck: But this I only deliver as a Report, though I heard the ſame Account from ſeveral, without any contradicting it. Theſe Things are remarkable, that it generally breaks in at the *Gable End* of the Houſes, and often kills Perſons in or near the *Chimney's Range*, darting moſt fiercely down the *Funnel* of the *Chimney*, more eſpecially if there be a *Fire*. I ſpeak here confuſedly of *Thunder* and *Lightning*; for when they do any Miſchief, the *Craſh* and *Lightning* are at the ſame Inſtant, which muſt be from the Nearneſs of the Cloud. One Time, when the *Thunder* ſplit the Maſt of a Boat at *James-Town*, I ſaw it break from the Cloud, which it divided into two, and ſeemed as if it had ſhot them immediately a *Mile* aſunder, to the Eye. It is dangerous, when it *thunders*, ſtanding in a narrow Paſſage, where there is a Thorough-paſſage, or in a Room betwixt two Windows; though ſeveral have been killed in the open Fields. It is incredible to tell how it will ſtrike large *Oaks*, ſhatter and ſhiver them, ſometimes twiſting round a Tree, ſometimes as if it ſtruck the Tree backwards and forwards, I had noted a fine ſpreading *Oak* in *James-Town* Iſland; in the Morning I ſaw it fair and flouriſhing, in the Evening I obſerved all the *Bark* of the Body of the Tree, as if it had been artificially peeled off, was orderly ſpread round the Tree in a Ring, whoſe Semidiameter was four *Yards*, the Tree in the Centre; all the Body of the Tree was ſhaken and ſplit, but its Boughs had all their Bark on; few Leaves were fallen, and thoſe on the Boughs as freſh as in the Morning, but gradually afterwards withered, as on a Tree that is fallen. I have ſeen ſeveral *vaſt Oaks*, and other *Timber-trees*, twiſted as if it had been a ſmall *Willow* that a Man had twiſted with his Hand, which I could ſuppoſe had been done by nothing but the *Thunder*. I have been told by very ſerious *Planters*, that 30 or 40 *Years* ſince, when the Country was not ſo open, the *Thunder* was more fierce, and that ſometimes after violent *Thunder* and *Rain*, the Roads would ſeem to have a perfect Caſt of *Brimſtone*; and it is frequent, after much *Thunder* and *Lightning*, for the *Air* to have a perfect *ſulphureous Smell.* Durſt I offer my weak Reaſons, I might here conſider the *Nature* of *Thunder*, and *compare* it with ſome *ſulphureous Spirits* which I have *drawn* from *Coals*, that I could no way *condenſe*, yet were inflammable; nay, would *burn* after they paſſed through the Water, and that ſeemingly fiercer, if they were not overpowered therewith. I have kept of this *Spirit* a conſiderable Time in Bladders, and though it appeared as if they were only blown with Air, yet, if I let it forth, and fired it with a Match or Candle, it would continue burning till all were ſpent. An Obſervance of the *Meteors* there, might perhaps not be impertinent, as both what are more rare, and what are more frequent, as of *Goſſmore* in great Abundance, and of thoſe ſmall *Cobwebs* in a Morning, which ſome have ſuppoſed to be *Meteors*. *Ignes fatui*, though there be many boggy *Swamps* and *Marſhes*, are ſeldom, if any are, ſeen there.

There be frequent little Sorts of *Whirlwinds*, whoſe Diameter may be ſometimes not paſt two or three *Yards*, ſometimes forty, which, whisking round in a Circle, paſs along the Earth, according to the Motion of the Cloud from whence they iſſue; and, as they paſs along, with their *gyrous*, or *circular Motion*, they carry aloft the dry Leaves into the Air, which fall again, often, in Places far remote. I have ſeen them deſcend in a calm ſun-ſhine Day, as if they had come from the Heavens in great Showers thereof, ſo that all the Elements ſeemed filled therewith; and I could perceive them to deſcend from on high as far as I could poſſibly diſcern a *Leaf*.

Vid. *Vol.* IV. II. *Cap.* I. *Sect.* XL.

I thought this made it manifeſt, whence many preternatural Showers have happened. I remember at Sir *Richard Atherton*'s in *Lancaſhire*, ſome few *Years* ago, there fell a great Number of the *Seeds* of *Ivy-berries*: At firſt we admired what they were, for they were covered with a thin Skin that was red, and reſembled the Figure of a ſmall *Wheat-corn*; but afterwards they fully manifeſted what they were, for many ſprouted, and took Root. I ſuppoſe they were carried aloft by ſome ſuch *Whirlwind*, and let fall there. I have purpoſely gone into the Place where I perceived this *Guſt*, which is notorious enough by the Noiſe it makes, with rattling the Leaves as it carries them aloft, and have found a fine ſharp *Breeze* of *Wind*,

The Waters.

Betwixt the two *Capes*, the Southern, called the *Cape Henry*, and the more Northerly, called *Cape Charles*, there runs up a great *Bay*, called the *Bay* of *Cheeſepeak*, nine *Leagues* over in ſome Places, in moſt ſeven, dividing *Virginia* into two unequal Parts: On the *Eaſt* Side of this *Bay* there lies a narrow Neck of Land, which makes the Countries of *Northampton* and *Accomack*; on the *Weſt* Side of the *Bay* there branch forth four great *Rivers*, *James-River*, *York-River*, *Rapahanack*, and *Potomack*.

The *Mouth* of *James-River*, which is the moſt Southerly of them, to the *Mouth* of *Potomack*, which is the moſt Northerly, may be 100 *Miles* Diſtance; but, as I have been credibly informed, the *Falls* of *James-River* are not paſt thirty *Miles* from *Potomack*, which is a vaſt large River, nine *Miles* over, in many Places. I have been told it was *navigable* nigh 200 *Miles*, much higher than any of the other Rivers: Whence I conclude, in future Times it will be the moſt conſiderable for Trade, when the Country comes to be inhabited further up into the main Land. The other *Rivers* are much about three *Miles* over apiece; and *James River* is *navigable*, at the leaſt, eighty *Miles*. Within four or five *Miles* of *James Town*, *James River* and *York River* are not paſt four or five *Miles* aſunder; yea, Sloops of conſiderable Carriage may ſail up the Branches of the two Rivers, till they come within a *Mile* the one of the other.

York River is diſtant from *Rapahanack*, in ſome Places, not paſt ten or twelve *Miles*; and *Rapahanack* from *Potomack* not paſt ſeven *Miles* in one Place, though it may be ſixty in others. The *Heads* of the *Branches* of the Rivers interfere and lock one within another, which I think is beſt expreſſed after the Manner that an *Indian* explained himſelf once to me, when I inquired how nigh the *Rivers* of *Carolina*, *Virginia*, and *Maryland*, aroſe out of the Mountains, from thoſe that ran *weſterly* on the other Side of the Mountains: He clapt the Fingers of one Hand betwixt thoſe of the other, crying, *They meet thus*; the Branches of different Rivers riſing not paſt 100 Paces one from the other: So that no Country in the World can be more curiouſly watered. But this Conveniency, at the preſent, I look on as the greateſt Impediment to the Advance of the Country, and the greateſt Obſtacle to *Trade* and *Commerce*; for the great Number of Rivers, and the Thinneſs of the Inhabitants, *diſtract* and *diſperſe* a *Trade*: So that all Ships in general gather each their Lading up and down 100 *Miles* diſtant, and the beſt of *Trade* that can be driven, is only a Sort of *Scotch Peddling*; for they muſt carry all Sorts of Truck that trade thither, having one Commodity to paſs off another. This (*i. e.*) the *Number* of *Rivers* is one of the chief Reaſons why they have no *Towns*: For every one being more ſollicitous for a private Intereſt and Conveniency, than for a publick, they will either be for making forty *Towns* at once, that is, two in every County, or none at all, which is the Country's Ruin.

The *Tides* in theſe *Rivers* regularly *ebb* and *flow* about two *Foot* perpendicular at *James-Town*: There is there, as they call it, a *Side* and *half Side*, that is, it *flows* near two *Hours* along by the *Shore*, after that it is *ebb* in the *Channel*, and again it *ebbs* near two *Hours* by the *Shore*, after that it is *Flood* in the *Channel*.

I ſuppoſe this is cauſed by many *Creeks* and *Branches* of the *Rivers*, which being conſiderably many, though only three or four *Miles* long, yet as broad as the *Thames* at *London*; others ten *Miles* long, ſome above twenty, that have little *freſh Water* which they carry of their own, but their *Current* primarily depending upon the *Flux* and *Reflux* of the *Sea*: So that after the *Side* is made in the *Channel*, it *flows* by the *Shore* a conſiderable Time, being that theſe *Creeks* are ſtill to fill, and therefore, as it were, draws a Source upwards by the *Shore*; and likewiſe, when the *Tide* returns in the *Channel*, the *Creeks*, that could not readily disburſe their Water, being ſtill to empty themſelves, they make an *Ebbing* by the *Shore*, a conſiderable Time after that it is

Flood, as I ſay, in the *Channel*. So far as the *Salt-waters* reach, the Country is deemed leſs *healthy:* In the *Freſhes* they more rarely are troubled with the *Seaſonings*, and thoſe *endemical* Diſtempers about *September* and *October*. This being very remarkable, it might perhaps be worthy the Diſquiſition of the moſt Learned to give an Account of the various Alterations, and fatal Effects, that the *Air* has on human Bodies, eſpecially when impregnated with a *marine Salt*; more peculiarly when ſuch an *Air* becomes ſtagnant.

There is one Thing more, remarkable in *Virginia:* Generally *twice* in the *Year*, *Spring* and *Fall*, at certain *Spring-tides*, the moſt of the Cattle will ſet on *Gadding*, and run, though it be twenty or thirty *Miles*, to the *Rivers*, to drink the *Salt-water*; at which Time there is ſcarce any ſtopping of them.

As for the *Waters* in the *Springs* in general, they are, I think, ſomewhat more eager than thoſe in *England*; in that I have obſerved, they require ſome Quantity more of *Malt* to make *Strong Beer* than our *Engliſh Waters*, and will not bear *Soap*. I have tried ſeveral, by *infuſing* of *Galls*, and found little Difference in the *Colours*; turning much like the *Colour* of common *Sacks* in Taverns.

There is a *Spring* in the *Iſle of Wight*, or *Nazamond County*, vents the greateſt *Source* of Water I ever ſaw, excepting *Holy Well* in *Wales*.

I could not try any Thing as to their *ſpecifick Gravity*, having neither *Aquapoiſe*, nor thoſe other Glaſſes I had contrived peculiarly for making ſuch Experiments; they being all loſt with my other Things. I had Glaſſes blown would hold about five *Ounces*, others about ten *Ounces*, with *Necks* ſo ſmall, that a Drop would make a conſiderable Variation: With theſe I could make much more critical and ſatisfactory Obſervations, as to the *ſpecifical Gravity* of Liquors, having *critical Scales*, than by any other Way yet by me tried. I uſed this Method to *weigh Urines*, which Practice I would recommend to the inquiſitive and critical Phyſicians; for there are more ſignal Variations in the *Weights* of *Urines*, than one would at firſt imagine: And when the Eye can diſcover little, but judge two *Urines* to be alike, they may be found to differ very much as to *Weight*. By *Weight* I find Obſervations may be made of *Affections* in the *Head*, which rarely make any viſible *Alterations* in the *Urine*. I have found two *Urines*, not much unlike, differ 22 *Grains* in the Quantity of about four or five *Ounces*. But let them that make thoſe Eſſays *weigh* all their *Urines* when *cold*, leſt they be thereby deceived. But to return to the *Spring-waters* in *Virginia:* There is a *Spring* at my *Lady Berkley*'s, called *Green Spring* (whereof I have been often told), ſo very *cold*, that it is dangerous drinking thereof in *Summer-time*, it having proved of fatal Conſequence to ſeveral.

There be many *petrefying Waters*, and, indeed, I believe few of the *Waters* but participate of the *petrefying Quality*, though there be few *Pebbles* or *paving Stones* to be found in all the Country. But I have found many Sticks with *cruſty* Congelations round them in the Runs of *Springs*, and *Stones* figured like Honey-combs, with many little *Stars*, as it were, ſhot in the Holes.

Mr. Secretary *Spencer* has told me of ſome Waters participating much of *Alum* or *Vitriol* towards *Potomack:* Up beyond the *Falls* of *Rapabanack* I have heard of *poiſonous Waters.*

When you make the *Capes* of *Virginia*, you may obſerve it *low Land*, ſo that at ſome Diſtance the Trees appear as if they grew in the Water; and as you approach nigher, to emerge thence. For 100 *Miles* up into the Country there are few *Stones* to be found, only in ſome Places *Rocks* of *Iron Ore* appear.

The Earth and Soil. n. 206. *p.* 941.

In ſome Places, for ſeveral *Miles* together, the *Earth* is ſo intermixed with *Oyſter-ſhells*, that there may ſeem as many *Shells* as *Earth*; and how deep they lie thus intermingled, I think, is not yet known: For at broken Banks they diſcover themſelves to be continued many Yards perpendicular. In ſeveral Places theſe *Shells* are much cloſer, and, being *petrefied*, ſeem to make a *Vein* of *Rock*. I have ſeen, in ſeveral Places, *Veins* of theſe *rocky Shells*, three or four *Yards* thick, at the Foot of a Hill, whoſe Precipice might be twenty *Yards* perpendicular, whoſe *Delf*, I ſuppoſe, ſhot under the Hill. Pieces of theſe *Rocks* broken off lie there, which, I ſuppoſe, may weigh twenty or thirty *Tuns* apiece, and are as difficult to be broken as our *Free-ſtone*. Of theſe *Rocks* of *Oyſter-ſhells*, that are not ſo much *petrefied*, they burn and make all their *Lime*; whereof they have that Store that no Generation will conſume.

Often, in the looſer Banks of *Shells* and *Earth*, are found perfect *Teeth petrefied*; ſome, whereof I have ſeen, could not be leſs than two or three *Inches* long, and above an *Inch* broad, though they were not *maxillary Teeth*; the Part that one might ſuppoſe grew out of the *Jaw*, was *poliſhed*, and *black*, almoſt as *Jet*; the Part which had been faſtened in the *Jaw* and *Gums* was *brown*, and not ſo ſhiningly *poliſhed*, or *ſmooth*. If they were, as they ſeemed to be, really *Teeth*, I ſuppoſe they might have been of *Fiſhes*. The *Back-bone* of a *Whale*, and, as I remember they told me, ſome of the *Ribs*, were digged out of the Side of a Hill, ſeveral *Yards* deep in the *Ground*, about four *Miles* diſtant from *James-Town* and the *River:* Mr. *Baniſter*, a Gentleman pretty curious in thoſe Things, ſhewed me, likewiſe, the *Joint* of a *Whale*'s *Back-bone*, and ſeveral *Teeth*; ſome whereof, he ſaid, were found in Hills beyond the *Falls* of *James-River*, at leaſt 150 *Miles* up in the Country.

The *Soil* in general is *ſandy*. I had deſigned, and I think it might be worth a critical Remark, to obſerve the Difference of *Soils* ſeem appropriated to the ſeveral *Sorts* of *Tobacco*; for there are not only the two diſtinct Sorts of *ſweet-ſcented* and *Aranoko Tobacco*, but of each of theſe be ſeveral Sorts much different, the *Seeds* whereof are known by diſtinct Names, they having given them the Names of thoſe Gentlemen moſt famed for ſuch Sort of *Tobacco*; as of *Prior-ſeed*, &c. nay, the ſame Sort of *Seed*, in different *Earths*, will produce *Tobacco* much different, as to Goodneſs. The richer the Ground, the better it is for *Aranoko Tobacco*, whoſe *Scent* is not much minded, their only Aim being to have it ſpecious, large, and to procure it a bright *Kite*'s-*foot Colour*.

I

I conceive *Tobacco* to be a Plant abounding with *nitro-ſulphureous* Particles; for the *Planters* try the Goodneſs of their *Seed*, by caſting a little thereof into the *Fire*; if it be good, it will *ſparkle*, after the Manner of *Gunpowder*; ſo will the *Stalks* of *Tobacco-leaves*, and perhaps has ſomething analogous to the *Narcotick Sulphur* of *Venus*, which the *Chymiſts* ſo induſtriouſly labour after. The World knows little of the Efficacy of its *Oil*, which has wonderful Effects in the *curing* of *old inveterate Sores*, and *ſcrophulous Swellings*, and ſome otherwiſe applied and qualified. The Goodneſs of *Tobacco* I look on primarily conſiſts in the *Volatility* of its *Nitre*; and hence the *ſandy Grounds* that are moſt impregnated therewith, and whoſe *nitrous Salt* is moſt *volatile* (for ſuch Grounds are quickelieſt ſpent), yield *Tobaccos* that have the richeſt *Scent*, and that ſhortly becomes a *pleaſant Smoak*; whereas, in *Tobacco* that grows on *ſtiff Ground*, the *Salts* ſeem more *fixed* and locked up in the *Oil*; ſo that, whilſt new, it is very heady and ſtrong, and requires ſome Time for its *Salts* to free themſelves, and become *volatile*; which it manifeſts by its having an *urinous Smell*. The ſame Reaſon ſatisfies, why *Tobacco* that grows on *low Lands*, as far as the *Salts*, though the Plant be never overflowed with *ſalt Water*, yet the Ground that feeds the Plant, being impregnated with *ſalt Water*, that *Tobacco ſmoaks* not pleaſantly, and will ſcarcely keep Fire, but do all that a Man can, will oft go out, till after it has been kept ſome conſiderable Time; which may be aſſigned to the more *fixed ſaline* Particles of the *marine Salts* in theſe Plants, which require more Time ere they be rendered *volatile*. I have obſerved, that that which is called *Pine-wood Land*, though it be a *ſandy Soil*, even the *ſweet-ſcented Tobacco*, that grows thereon, being large and porous, agreeable to *Aranoko Tobacco*, ſmoaks as coarſly as *Aranoko*: Wherefore it is, that I believe the *Microſcope* might make notable Diſcoveries towards the Knowledge of *good Tobacco*; for the cloſer the Compoſition of the *Leaf*, the *better* the *Tobacco*: And therefore the Planters and Merchants brag of the Subſtance of their *Tobacco*; which Word, did they always take it in a true Senſe, for the *Solidneſs*, and not miſtake it for the *Thickneſs*, it would be more conſonant to a true Obſervation: For, as I ſaid of the *Pine-wood Tobacco*, ſome of it is *thick* and not *ſolid*, and differs from the beſt *Tobacco*, as *Buff* does from *tann'd Leather*; ſo that if the *Tobacco* be ſound, and not rotten, you may give a great Gueſs at the *Goodneſs* of *Tobacco*, when you *weigh* the *Hogſheads*, before you ſee them; for if an equal Care be taken in the Packing of them, the *beſt Tobacco* will *weigh* the *heavieſt*, and *pack* the cloſeſt. Now I ſaid, that the *ſweet-ſcented Tobacco*, moſt in Vogue, which was moſt famed for its *Scent*, was that that grew on *ſandy Land*; which is true, if you would *ſmoak* it whilſt *new*, or whilſt only two or three *Years* old; but if you keep the *ſtiff Land Tobacco*, which is generally a *Tobacco* of great Subſtance, five or ſix *Years*, it will much excel; for though the *ſandy Land Tobacco* abounds with a *volatile Nitre* at firſt, yet the *ſtiff Land Tobacco* abounds with a greater Quantity of *Nitre*, only that it is locked up in its *Oil* at firſt, and requires more Time to extricate itſelf, and become *volatile*; but the *Pine-wood Land* having little of the *nitro-*

ſulphureous Particles, neither is, nor never will make any Thing of a *rich Smoak*. Diſcourſing hereof, ſome Days ſince, to a Gentleman of good Obſervation, that has been verſed with *Malting*, he aſſured me, to back this my Suppoſition, or *Hypotheſis*, he had obſerved, that *Barley* that grew on *ſtiff Ground* required more Time conſiderably to mellow and come to Perfection, than that that grew on *light Land*. Having proceeded thus far to ſpeak of *Tobacco*, I ſhall add one or two Things more. The Planters differ in their Judgments about the *Time* of *planting*, or *pitching* their *Crops:* Some are for *pitching* their *Crops* very early, others late, without any Diſtinction of the Nature of the *Soils*; and it is from the different Effects that they find in that, that ſometimes the early, ſometimes the late *planting* ſucceeds; but they have not the Reaſon to judge of the Cauſe, to conſider the Accidents of the Year, and the Difference of the *Soils*. In *ſandy Grounds* they need not ſtrive ſo much for *early planting*, the Looſeneſs of the Earth, and the kind-natured Soil, yielding all that it can, eaſily and ſpeedily; and *Sand* retaining the *Heat*, makes the *Plants* grow faſter: But in *ſtiff Soils*, if the *Crops* be not *early pitched*, ſo that, during the Seaſon of *Rains*, it have got conſiderable Roots, and ſhot them ſome Depth, if early *Droughts* come, it ſo binds the Land, that the Roots never ſpread nor ſhoot deeper or further than the *Hills* that they are *planted* in. Obſerving this on the *Plantation* where I lived, that it was *ſtiff Ground*, I adviſed them to *plant* their *Crops* as *early* as poſſible; and, in order thereunto, I tried ſeveral Ways to further the *Plants*; and what I found moſt advantageous was, by taking an *Infuſion* of *Horſe-dung*, and putting thereon *Soot*, and then my *Seeds*; this I kept 48 *Hours* in an ordinary *digeſtive Heat:* When I *ſowed*, I mixed *Aſhes* with the *Seed* (having decanted the Liquor), that the *Seed* might *ſow* the evener; the Effect was, that my *Plants* came up ſooner, grew ſwifter, and I had five *Plants* for *one* more than any of the other *Beds* round about mine.

There be various *Accidents* and *Diſtempers* whereunto *Tobacco* is liable; as the *Worm*, the *Fly*, *Firing to Turn*, as they call them, *Frenchmen*, and the like. I propoſed ſeveral Ways to *kill* the *Worm* and *Fly*, as by *Sulphur*, and the like; but had no Opportunity to experiment it: I ſhall ſet down that I had moſt Hopes of, which perhaps may give a Hint to others to try or improve. *Tobacco-ſeed* is very ſmall, and, by Conſequence, ſo is the *young Plant* at firſt; and, if gleamy Weather happen at that Time, it breeds a ſmall *Fly*, which conſumes the *Plume* of the *Plant*. Now it being early in the *Year* when they *ſow* the Seed, *viz.* about the fourteenth of *January*, they cover the Ground, to ſecure, as well as they can, their *tender Plants* from the nipping *Froſts* that may happen in the Nights; they cover them only with a few *Oak-leaves*, or the like, for *Straw* they find apt to harbour or breed this *Fly*. I therefore would adviſe them to *ſmoak Straw* with *Brimſtone* once in two or three Nights, and ſo they might cover them ſecurely, with that which would preſerve them infinitely beyond the Covering with *Oak-boughs*; indeed, I would adviſe them to keep peculiarly ſo much of their *Indian Corn-blades*, which they gather for their *Fodder*,

Fodder, for this very Purpoſe, being, as I conceive, much the beſt; there being no Chaff to foul their Beds, and prejudice them when they ſhould *weed* them.

What they call *Firing*, is this: When *Plants* are of ſmall Subſtance, as when there has been a wet and very cold Seaſon, and very hot Weather ſuddenly enſues, the *Leaves* turn *brown*, and dry to Duſt; the Cauſe I conceive to be hence: The *Plant* being feeble, and having a ſmall Quantity of *Oil*, which makes the more *ſolid* Part of the Plant, the *Earth* being ſuddenly heated by the Sun's fiercer Beams, the Roots are rather ſcorched and dried up in the *Earth*, than nouriſhed; ſo that the *Plant*, conſiſting only of *watery* Parts, is conſumed, as it were, by Fire: Sometimes hopeful Plants, when by a ſudden Guſt ſome *Maſter-veins* are broken, if ſudden Heat enſues, they likewiſe *fire*: For being not come to Maturity, and being deprived of the Supports of *Life* and *Vegetation*, they likewiſe periſh, are dried up, and fall to Duſt.

Frenchmen they call thoſe *Plants*, whoſe *Leaves* do not ſpread and grow large, but rather ſpire upwards, and grow tall: Theſe *Plants* they do not tend, being not worthy their Labour. Were they ſo critical, I believe they might have great Gueſs what Plants were moſt likely to turn *Frenchmen*, by obſerving whether the *Roots* of the *Plants* run downwards, as thoſe whoſe Branches are apteſt to ſpire upwards; for tho' I have not made poſitive Proof thereof, I have ſomething more than bare Fancy for my Conjecture: I have pulled up ſome of theſe *Frenchmen*, and compared them with the Roots of ſome other *Plants*, and found them much longer than others; and it is obſervable, *looſe Soils*, and *ſandy Ground*, are more ſubject thereto than the *ſtiff Land*.

The Country, of itſelf, is one intire *Wood*, conſiſting of large *Timber-trees* of ſeveral Sorts, free from *Thickets* or *Under-wood*; the ſmall *Shrubs* growing only on Lands that have been cleared, or in *Swamps*; and thus it is for ſeveral *Hundreds* of *Miles*, even as far as has yet been *diſcovered*.

n. 206. p. 978. As to the River on the other Side the Mountains, ſaid to *ebb* and *flow*, I have been aſſured by Col. *Bird*, who is one of the intelligenteſt Gentlemen in all *Virginia*, and knows more of *Indian* Affairs than any Man in the Country, that it was a Miſtake; for that it muſt run into a *Lake* of *freſh Water*, to which the *French* have given the Name of *Lake Petite*, there being ſeveral larger *Lakes* betwixt that and *Canada*. The *French* poſſeſſing themſelves of theſe *Lakes*, no doubt will, in a ſhort Time, be abſolute Maſters of the *Beaver Trade*, the greateſt Numbers of *Beavers* being catched there.

But to return to the Parts of *Virginia* inhabited by the *Engliſh*, which, in general, is a very fertile *Soil*, far ſurpaſſing *England*; for their *Engliſh Wheat* (as they call it, to diſtinguiſh it from *Maze*, commonly called *Virginia Wheat*) yields generally betwixt fifteen and thirty *Fold*, the Ground only once ploughed; whereas it is a good Crop in *England* that yields above eight *Fold*, after all their Toil and Labour: And yet, in Truth, it is only the *barreneſt* Parts that they have cultivated, *tilling* and *planting* only the *high Lands*, leaving the richer *Vales* unſtirred, becauſe they underſtand not any Thing of *Draining*. So that the richeſt *Meadow Lands*, which is one Third of the Country, is *Boggy*, *Marſh*, and *Swamp*, whereof they make little Advantage, but loſe in them abundance of their Cattle, eſpecially at the firſt of the *Spring*, when the *Cattle* are weak, and venture too far after young Graſs. Whereas vaſt Improvements might be made thereof; for the Generality of *Virginia* is a *ſandy Land* with a *ſhallow Soil:* So that after they have cleared a freſh Piece of Ground out of the *Woods*, it will not bear *Tobacco* paſt two or three *Years*, unleſs *Cow-penn'd*; for they *manure* their Ground by keeping their Cattle, as in the South you do your Sheep, every Night confining them within Hurdles, which they remove when they have ſufficiently *dunged* one Spot of Ground; but, alas! they cannot improve much thus: Beſides, it produces a ſtrong Sort of *Tobacco*, in which, the *Smoakers* ſay, they can plainly taſte the Fulſomeneſs of the *Dung*; therefore every three or four *Years* they muſt be for *clearing* a new Piece of *Ground* out of the *Woods*, which requires much Labour and Toil; it being ſo thick grown, all over, with maſſy Timber. Thus their *Plantations* run over vaſt Tracts of Ground, each ambitioning to engroſs as much as they can, that they may be ſure to have enough to *plant*, and for their Flocks and Herds of *Cattle* to range and feed in; ſo that *Plantations* of 1000, 2000, or 3000 *Acres*, are common; whereby the Country is thinly inhabited, their Living ſolitary and unſociable, trading confuſed and diſperſed, beſides other Inconveniencies: Whereas they might improve 200 or 300 *Acres* to more Advantage, and would make the Country much more healthy; for thoſe that have 3000 *Acres* have ſcarce *cleared* 600 *Acres* thereof, which is peculiarly termed the *Plantation*, being ſurrounded with the 2400 *Acres* of *Wood:* So that there can be no free or even Motion of the *Air*, but the *Air* is kept either *ſtagnant*, or the lofty *ſulphureous* Particles of the Air, that are higher than the Tops of the Trees, which are above as high again as the Generality of the *Woods* in *England*, deſcending when they paſs over the *cleared* Spots of Ground, muſt needs, in the *violent Heat* of Summer, raiſe a preternatural Ferment, and produce bad Effects. Nor is it any Advantage to their Stocks or Crops; for did they but *drain* their *Swamps* and *Low Lands*, they have a very deep Soil, that would endure *Planting* twenty or thirty *Years*; and ſome would ſcarce ever be worn out, but be ever longer better: For they might lay them all Winter, or when they pleaſed, in Water; and the Product of their Labour would be double or treble, whether *Corn* or *Tobacco*.

On the *Plantation* where I lived, I drain'd a good large *Swamp*, which fully anſwered Expectation; for with three Men, in thirteen Days, I *drained* the whole *Swamp*; and, it being *ſandy Land*, ſoaks and drains admirably well; and, what I little expected, I laid a *Well* dry at a conſiderable Diſtance. The Gentlewoman who was Owner of that *Plantation* was in *England* laſt Year, and I think Dr. *Moulin* was by when ſhe aſked me, Now to teach her how ſhe might make her *Tobacco* that grew in that *Swamp* leſs; for it produced ſo very large, that it was ſuſpected to be of the *Aranoko Kind:* I

told

told her, though the Complaint was rare, yet there was an excellent Remedy for that, in letting every *Plant* bear eight or nine *Leaves* inſtead of four or five, and ſhe would have more *Tobacco*, and leſs *Leaves*.

There are many other Places as eaſy to *drain* as this, though of larger Extent, and richer *Soil:* Even in *James-Town Iſland*, which is much what of an oval Figure, there is a *Swamp* runs diagonalwiſe over the Iſland, whereby are loſt at leaſt 150 *Acres* of Land, which would be *Meadow*, and would turn to as good Account as if it were in *England:* Beſides, it is the great Annoyance of the Town, and no doubt but it makes it much more *unhealthy*. If therefore they but ſcoured the *Channel*, and made a pretty ordinary Trench all along the Middle of the *Swamp*, and placed a *Sluice* at the Mouth where it opens into the back *Creek* (for the Mouth of the *Channel* there is narrow, has a good hard Bottom, and is not paſt two *Yards* deep when the *Flood* is out; as if Nature had deſign'd it before-hand); they might thus *drain* all the *Swamp* abſolutely dry, or lay it under Water, at their Pleaſure.

And now, ſince we are ſpeaking of *James-Town*, give me Leave to adjoin ſome Reflections as to the *Situation* and *Fortifications* of the Place. *James-Town Iſland* is rather a *Peninſula*, being joined to the *Continent* by a ſmall Neck of Land, not paſt twenty or thirty Yards over, and which, at *Spring-tides*, is overflowed, and is then an abſolute *Iſland*. Now they have built a ſilly ſort of a *Fort*, that is, a Brick Wall, in the Shape of a *Halfmoon*, at the Beginning of the *Swamp*, becauſe the *Channel* of the *River* lies very nigh the Shore; but it is the ſame as if a *Fort* was built at *Chelſea* to ſecure *London* from being taken by Shipping. Beſides, Ships paſſing up the *River* are ſecured from the *Guns* of the *Fort*, till they come directly over-againſt the *Fort*, by reaſon the *Fort* ſtands in a *Vale*, and all the *Guns* directed down the *River*, that ſhould play on the Ships as they are coming up the *River*, will lodge their Shot within ten, twenty, or forty *Yards*, in a riſing Bank, which is much above the Level of the *Fort:* So that if a Ship gave but a good Broadſide, juſt when ſhe comes to bear upon the *Fort*, ſhe might put the *Fort* into that Confuſion, as to have free Paſſage enough.

But if they would build a *Fort* for the Security of the Town and Country, I conceive it ſhould be on *Archer*'s-*Hope Point*; for that would ſtop the Ships from paſſing up the *River* before they came to the Town, and would ſecure the Town from being blocked up by Sea. The *Channel* at *Archer*'s-*Hope Point* lies cloſe by the Shore, and makes ſuch an Angle there, by reaſon of *Hog-Iſland*, that, going up or down the *River*, let the Wind be where it will, they muſt there bring the contrary *Tack* on *Board*; and generally, when they *About the Ship*, as they call it, they are ſo nigh the Shore, that a Man may almoſt fling a Finger-ſtone on Board. How much this hinders the Motion of a Ship, and what Confuſion it muſt be to them to bring a contrary *Tack* on *Board* whilſt they have all the *Guns* of a *Fort* playing ſo nigh upon them, may readily be conceived. *Archer*'s-*Hope* is a Neck of Land that runs down three *Miles* long, not much paſt *Half* a *Mile* broad, betwixt the *main River* and *Archer*'s-*Hope Creek*, which has large

Marſhes and *Swamps*; ſo that a *Citadel*, built upon the *Point*, would almoſt be impregnable, being it could be attacked no Way but one, which is ſo narrow a ſlender Neck of Land, that it would be difficult to take it that Way; and it would ſecure *James-Town* from being *blocked*, being it would not be paſt a *Mile* by Water to the Point of *James-Town Iſland*: And the *Iſland* is ſo ſurrounded with Water and *marſhy* Land, that the Town could never be Bomb'd by Hand.

But now, to return to the Reflections of *Improving* and *Manuring* of Land in *Virginia*: Hitherto, as I have ſaid, they have uſed none but that of *Cow-penning*; yet I ſuppoſe they might find very good *Marle* in many Places. I have ſeen both the *red* and *blue Marle* at ſome Breaks of Hills. This would be the propereſt *Manure* for their *ſandy Land*, if they ſpread it not too thick, theirs being, as I have ſaid, a *ſhallow ſandy Soil*; which was the Reaſon I never adviſed any to uſe *Lime*, though they have very good *Lime* of *Oyſter-ſhells*; but that is the propereſt *Manure* for *cold clay Land*, and not for *ſandy Soil*. But as moſt Lands have one *Swamp* or another bordering on them, they may certainly get admirable *Slitch*, wherewith to *manure* all their *Up-lands*: But this, ſay they, will not *improve* Ground, but clods, and grows hard. It is true, it will do ſo for ſome Time, a *Year* or *two* at the firſt; but did they caſt it in *Heaps*, and let it lie for two or three *Years*, after a *Froſt* or *two* had ſeized it, and it had been well pierced therewith, I doubt not it would turn to good Account. And for this I have ſomething more than bare Conjecture: For diſcourſing it once with a good notable *Planter*, we went to view a *Heap* thereof, that caſually he had caſt up betwixt three or four *Years* before; and we found it not very binding, but rather a fine natural *Mould*: Whereupon he did confeſs, he then remembered, that out of a Ridge of the like *Mould* he had had very large *Plants*, which muſt have been of the like *Slime* or *Slitch* caſt up before. But he ſaid, that himſelf, and others, deſpaired of this *Manure*, becauſe they had taken of this *Slitch* freſh and moiſt out of the *Swamp*, and filled *Tobacco-hills* with it, and in the midſt of it *planted* their *Plants*; which ſo bound the Roots of their *Plants*, that they never came to any Thing.

They neither *Houſe* nor *Milk* any of their Cows in Winter, having a Notion that it would kill them; yet I perſuaded the Lady, where I lived, to *milk* four *Cows*, the laſt Winter that I ſtayed in the Country; whereof ſhe found ſo good Effect, that ſhe aſſured me ſhe would keep to my Advice for the future; and alſo, as I had further urged, *houſe* them too, for which they have mighty Conveniencies, their *Tobacco-houſes* being empty ever at that Time of the Year, and may eaſily be fitted in two or three Days Time, without any Prejudice; whereby their Cattle would be much ſheltered from thoſe pinching ſharp *Froſts* that ſome Nights, on a ſudden, become very ſevere. I had another Project for the Preſervation of their Cattle, which proved very ſucceſsful: I urged the Lady to ſow her *Wheat* as early as poſſibly ſhe could, ſo that before *Winter* it might be well rooted, to be early and flouriſhing at the firſt of the *Spring*; ſo that ſhe might turn thereon her weak Cattle, and ſuch as ſhould at any Time be *ſwamped*, whereby they might be recruited and ſaved, and it would do the *Wheat* good alſo. I adviſed her, likewiſe, to ſave, and carefully gather the *Indian Corn*, Tops and Blades, and all her Straw, and whatſoever could be made *Fodder* for her Cattle; for they get no *Hay* (though I was urging her to that too, and to ſow *Saintfoin*; for being a *ſandy Soil*, I am confident it would turn to a very good Account), and little *Fodder*; but, as they think, *Corn* being more nouriſhing, feed them with their *Indian Corn*, which they give them Morning and Evening. Thus they ſpend great Quantities of *Corn*; and, when all is done, what ſignify two or three Heads of *Corn* to a Beaſt in a Morning? It only makes them linger about the Houſes for more; and after ſuch ſweet Food they are not ſo apt to brouze on the Trees and the coarſe Graſs which the Country affords: So that their *Guts* ſhrink up, and they become *Belly-ſhot*, as they call it. I adviſed, therefore, never to give them any thing in a Morning, whereby, as ſoon as they were ſet forth of the *Cow-pens*, they would fall a feeding; and though they filled their Bellies only with ſuch coarſe Stuff as had little Nouriſhment in it, yet it would keep out their Bellies, and they would have a better *Digeſtion*; and then when they were come Home at Night, to *fodder* them, beginning with *Straw* and their *coarſeſt Fodder*, which they would learn to eat by Degrees, before they taſted that that was more delicate; and, whilſt their *Digeſtion* was ſtrong, would yield them *Nouriſhment* to keep them ſtill ſo: Afterward, when the *Winter* pinch'd, their fine Fodder then would ſtand them in ſtead; and hereby they might preſerve their weakeſt Cattle by theſe Methods, and Help of the *Wheat-patch*. She (the Gentlewoman where I lived) ſav'd all her Cattle, and loſt not one in two *Winters* after that I ſtayed there; beſides, ſhe ſaved above twenty *Barrels* of *Corn*, and a *Barrel* of *Corn* is commonly worth ten *Shillings*. Nay, further, the laſt *Spring* ſhe *fed* two Beaſts, a Bullock and a Cow, *fat* upon her *Wheat*, with the Addition only of a little *boiled Corn*, and yet the *Wheat* was ſcarce eat down enough.

But to return again to the *Nature* of the *Earth*. I have obſerved, that at five or ſix *Yards* deep, at the Breaks of ſome Banks, I have found *Veins* of *Clay* admirable good to make *Pots*, *Pipes*, or the like; and whereof, I ſuppoſe, the *Indians* make their *Pipes*, and *Pots* to boil their Meat in; which they make very handſomely, and which will endure the *Fire* much better than moſt *Crucibles*. I took of this *Clay*, dried, powdered, and ſifted, powdered and ſifted *Potſherds*, and *Glaſs*, three Parts, two Parts, and one Part, as I remember, and therewith made a large *Crucible*; which was the beſt I yet ever tried in my Life. I took it once *red-hot* out of the *Fire*, and clapt it immediately into the Water, and it ſtarted not at all. The Country abounds mightily with *Iron-Ore*, that, as I have been aſſured by ſome, upon Trial, has been found very good. There are Rocks thereof appear at the Precipice of Hills, at the Foot whereof there runs a River fit for a *Forge*, and there is *Wood* enough to ſupply it with *Charcoal*. As I have heard, there were formerly ſome Perſons undertook the Work, and when they had made but a ſmall Quantity of *Iron*, which proved very good, the *Indian Maſſacre* happened; and they being higher ſeated than the then inhabited

Part of the Country, were all cut off, and the *Works* demoliſhed. Some *Indians* brought Col. *Bird* ſome *Black-lead*, whereof he has told me there is great Store. There is very curious *Talc* towards the *Falls* of *Rapahanock River*, which they *burn*, and make a delicate *White Waſh* of it. The Secretary of State, Col. *Spencer*, has aſſured me, there were *vitriolick* or *aluminous Earths* on the Banks of *Potomack*.

The Birds. Ib. *p.* 988.

There are three Sorts of *Eagles*; the largeſt I take to be that they call the *Grey Eagle*, being much of the Colour of our *Kite* or *Glead*; the ſecond is the *Bald Eagle*; for the Body and Part of the Neck being of a *dark Brown*, the upper Part of the Neck and Head is covered with a *white* ſort of *Down*, where it looks very *bald*, whence it is ſo named: The third Sort is the *Black Eagle*, reſembling moſt the *Engliſh Eagle*; they build their Neſts much after the Manner that Dr. *Willoughby* deſcribes, and generally at the Top of ſome tall old Tree, naked of Boughs, and nigh the River-ſide; and the People fell the Tree, generally, when they take the Young. They are moſt frequently ſitting on ſome tall Tree by the River-ſide, whence they may have a Proſpect up and down the River, as I ſuppoſe, to obſerve the *Fiſhing-Hawks*; for when they ſee the *Fiſhing-Hawk* has ſtruck a *Fiſh*, immediately they *take Wing*, and it is ſometimes very pleaſant to behold the Fight; for when the *Fiſhing-Hawk* perceives herſelf purſued, ſhe will ſcream, and make a terrible Noiſe, till at length ſhe let fall the *Fiſh* to make her own Eſcape, which the *Eagle* frequently catches before it reach the Earth or Water. Theſe *Eagles* kill young *Lambs*, *Pigs*, &c.

The *Fiſhing-Hawk* is an abſolute Species of *King's-Fiſher*, but full as large, or larger than our *Jay*, much of the Colour and Shape of a *King's-Fiſher*, though not altogether ſo curiouſly feathered: It has a large Crop; and, as I remember, there is a little *King's-Fiſher*, much the ſame, in every Reſpect, with ours.

If I miſtake not, I have ſeen both the *Goſs-Hawk* and *Falcon*; beſides, there are ſeveral Sorts of the leſſer kind of *Stannels*.

There is likewiſe the *Kite*, and the *Ringtail*.

There is both a *Brown Owl* and a *White Owl*, muchwhat as large as a *Gooſe*, which often kills their *Hens* and *Poultry* in the Night. The *White Owl* is a very delicately feathered Bird, all the Feathers upon her Breaſt and Back being *Snow-white*, and tipped with a Punctal of *Jet-black*: Beſides, there is a *Barn-Owl*, much like ours, and a little Sort of *Scritch-Owl*.

There is both the *Raven* and the *Carrion Crow*.

The *Night-Raven*, which ſome call the *Virginian Bat*, is about the Bigneſs of a *Cuckow*, *feathered* like them, but very ſhort, and ſhort-legged, not diſcernible when it flies, which is in the Evening, ſcudding like our *Night-Raven*.

There is a great Sort of *ravenous Bird* that feeds upon *Carrion*, as big, very nigh, as an *Eagle*, which they call a *Turkey-Buſtard*; its Feathers are of a *duſkiſh Black*; it has *red Gills*, reſembling thoſe of a *Turkey*, whence it has its Name; it is nothing of the ſame Sort of *Bird* with our *Engliſh Turkey-*

Buſtard, but it is rather a Species of the *Kite*; for it will hover on the Wing ſomething like them, and is *carnivorous*. The *Fat* thereof, diſſolved into an *Oil*, is recommended mightily againſt *old Aches* and *Sciatica Pains*.

The *Pica-Glandaria*, or *Jay*, is much leſs than our *Engliſh Jay*, and of another Colour; for it is all *Blue* where ours is *Brown*; the Wings *marbled* as curiouſly as ours are: It has both the ſame *Cry*, and ſudden jetting Motion.

There are great Variety and Curioſity in the *Woodpeckers*: There is one as big as our *Magpye*, with *blackiſh brown* Feathers, and a large *ſcarlet Tuft* on the Top of the Head. There are four or five Sorts of *Woodpeckers* more, variegated with *green*, *yellow*, and *red Heads*; others ſpotted *Black* and *White*, moſt lovely to behold. There's a Tradition amongſt them, That the *Tongue* of one of theſe *Woodpeckers*, dried, will make the *Teeth* drop out, if pricked therewith, and cure the *Tooth-ach*.

There be *Wild Turkeys* extreme large. They talk of *Turkeys*, that have been killed, that have weighed betwixt fifty and ſixty *Pounds* Weight; the largeſt that ever I ſaw weighed ſomething better than 38 *Pounds*. They have very long Legs, and will run prodigiouſly faſt: I remember not that ever I ſaw any of them on the Wing, except it were once. Their *Feathers* are of a *blackiſh ſhining Colour*, that in the Sun-ſhine, like a *Dove*'s *Neck*, are very ſpecious.

Hens and *Cocks* are, for the moſt part, without *Tails* and *Rumps*; and, as ſome have aſſured me, our *Engliſh Hens*, after ſome Time being kept there, have their *Rumps* rot off; which I am the apter to believe, being all their *Hens* are certainly of *Engliſh Breed*. I am ſorry I made no *anatomical* Obſervation thereof, and Remarks about the Uſe of the *Rumps* in *Birds*, which at preſent I take to be a Couple of *Glands*, containing a ſort of Juice for the Varniſhing of the Feathers; having obſerved, all *Birds* have much Recourſe with their *Bills* to the *Rumps*, when they dreſs their *Plumes*, whereby they ſcud through the Air more nimbly in their Flight.

Partridges there are much ſmaller than ours, and reſort in *Covies*, as ours do: Their Fleſh is very white, and much excels ours, in my Mind: *Sed de* Guſtibus *non eſt diſputandum*.

Their *Turtle-Doves* are of a *duſkiſh-blue Colour*, much leſs than our common *Pigeons*; the whole *Train* is longer much than the *Tails* of our *Pigeons*, the *middle Feather* being the longeſt. There is a ſtrange Story, of a vaſt Number of theſe *Pigeons* that came in a Flock a few *Years* before I came thither: They ſay, they came through *New England*, *New York*, and *Virginia*, and were ſo prodigious in Number, as to darken the Sky, for ſeveral Hours, in the Place over which they flew, and break maſſy Boughs where they lighted, and many like Things, which I have had aſſerted to me by many Eye-witneſſes of Credit, that to me it was without doubt, the Relators being very ſober Perſons, and agreeing in the Story: Nothing of the like ever happened ſince, nor did I ever ſee paſt ten in a Flock together, that I remember.

The *Thruſh* and *Feldefare* are much like ours, and are only ſeen in *Winter* there, accordingly as they are here.

Their *Mocking Birds* may be compared to our *Singing Thruſhes*, being much of the ſame Bigneſs. There are two Sorts, the *Grey*, and the *Red:* The *Grey* has Feathers much of the Colour of our *Grey Plovers*, with *White* in the *Wings*, like a *Magpye*; this has the much *ſofter Note*, and will imitate, in its *Singing*, the *Notes* of *all Birds* that it hears, and is accounted much the fineſt *Singing Bird* in the World.

This *Mocking Bird*, having its Name from *mimicking* all other Birds in *Singing*, is a wonderful mettled Bird, bold and brisk, and yet ſeems to be of a very tender Conſtitution; neither *Singing* in *Winter*, nor in the Midſt of *Summer*; and with much Difficulty are any of them brought to live in *England*.

The *Red Mocking Bird* is of a *duſkiſh Red*, or rather *Brown:* It *ſings* very well, but has not ſo *ſoft* a *Note* as the *Grey Mocking Bird*.

Of the *Virginia Nightingale*, or *Red Bird*, there are two Sorts: The *Cocks* of both Sorts are of a pure *Scarlet*, the *Hens* of a *duſkiſh Red*. I diſtinguiſh them into two Sorts; for the one has a *tufted Cop* on the Head, the other is *ſmooth-feathered*. I never ſaw a *tufted Cock* with a *ſmooth-headed Hen*, or on the contrary; they generally reſorting a *Cock* and *Hen* together, and play in a Thicket of Thorns or Briars in the Winter; nigh to which the Boys ſet their Traps, and ſo catch them, and ſell them to the Merchants for about *Sixpence* apiece, by whom they are brought for *England*. They are ſomething leſs than a *Thruſh*.

There is a Bird, very injurious to *Corn*, they call a *Black-bird:* I look on it to be a ſort of *Starling*, for they cry ſomething like them, but do not *ſing*; much what of the ſame Bigneſs, have Fleſh *blackiſh*, like theirs. They reſort in great Flocks together; they are as *black* as a *Crow* all over, their Bills and all, only ſome of them have *ſcarlet* Feathers in the *Pinions* of their *Wings*.

They have a *Lark* nothing differing from our common *Lark:* They have another Bird, which they call a *Lark*, that is much larger, as big as a *Starling:* It has a *ſoft Note*, feeds on the Ground, and, as I remember, has the ſpecifical Character of a *Long Heel*; it is more inclined to *Yellow*, and has a large *Halfmoon*, on its *Breaſt*, of *Yellow*.

They have a *Martin* very like, only larger than ours, that builds after the ſame Manner. The Honourable Col. *Bacon* has remarked, for ſeveral *Years*, that they conſtantly come thither upon the 10th of *March*, one or two of them appearing before, being ſeen hovering in the Air for a Day or two, then go away, and, as he ſuppoſed, returned with the great Flock. The Colonel delighted much in this *Bird*, and made *Holes*, like *Pigeon-holes*, at the End of his Houſe, with Boards purpoſely for them.

Their *Swallow* differs but little from ours.

They have a Bird they call a *Blue-bird*, of a curious *Azure* Colour, about the Bigneſs of a *Chaſinch*.

There be other Sorts of *Goldſinches*, variegated with *Red*, *Orange*, and *Yellow* Feathers, very ſpecious and beautiful.

Sparrows not much different from the *Engliſh*, but they build not in th *Eaves* of *Houſes*, that ever I ſaw.

The *Snow-Bird*, which I take to be much the ſame with our *Hedge-Sparrows*; this is ſo called becauſe it ſeldom appears about *Houſes* but againſt *Snow*, or very cold Weather.

The *Humming-Bird*, that feeds upon the *Honey* of *Flowers*. I have been told by ſome Perſons, that they have kept of theſe *Humming-Birds* alive, and *fed* them with Water and Sugar: They are much the *ſmalleſt* of all Birds, have long *Bills*, and curious coloured Feathers, but differ much in Colour.

Herons, three or four ſeveral Sorts: One larger than the *Engliſh*, feathered much like a *Spaniſh Gooſe*; another Sort that only comes in Summer, *Milk-white*, with *red* Legs, very lovely to behold.

The *Bittern* is there leſs than in *England*, and does not make that *ſounding Noiſe*, that ever I heard.

Curlews, ſomething leſs than our *Engliſh*, though bigger than a *Wimbrel*.

The *Sand-Piper*, much reſembling the *Engliſh*.

The *Snipe*, two Sorts; one reſembling *ours*, the other much leſs.

The *Tewits* are ſmaller than the *Engliſh*, and have no long *Toppings*, but juſt like a young one that begins to fly.

There are great Numbers of *Wild-Swans*.

Wild-Geeſe and *Brent-Geeſe* all Winter, in mighty Flocks; *Wild-Ducks* innumerable; *Teal*, *Wigeon*, *Sheldrakes*, *Virginia-Didapers*, the *Black-Diver*, &c.

In my Return home for *England*, *May* 1686. off of the *Banks* of *Newfoundland*, when we were, according to Account, 100 *Leagues* from the Shore, we ſaw ſeveral prodigious floating Iſlands of the *Ice*, no leſs our Wonder than our Terror; for they were very dangerous. I got the Maſter to ſail one Day as nigh one of them as we ſecurely durſt, which we judged to be full a *League* in Length, and was higher above Water than the Top of our *Main-maſt*: The *Snow* drove to and fro upon it, as upon a large Plain. There was a great Flock of ſmall *Black-Divers*, that were not much bigger than a *Feldeſare*, came to us a little before; but all of them then left us, and betook themſelves to this Iſland of *Ice*. We ſaw, as I remember, nigh thirty of theſe Iſlands of *Ice*. Captain *Rider*, being ſome few Days later in his Paſſage, and bearing more to the *Nore*, told me, he ſaw many more of thoſe Iſlands of *Ice*, and ſome much larger.

There are in *Virginia* a great many *Cormorants*, ſeveral Sorts of *Gulls*, and, in and about the *Bay*, many *Bannets*.

The Beaſts. *n.* 210. *p.* 121. There were neither *Horſes*, *Bulls*, *Cows*, *Sheep*, or *Swine*, in all the Country, before the coming of the *Engliſh*, as I have heard, and have much Reaſon to believe: But now, amongſt the *Engliſh* Inhabitants, there are good Store of *Horſes*, though they are very negligent and careleſs about the Breed. It is true, there is a *Law*, that no *Horſe* ſhall be kept *ſtoned* under a *certain Size*; but it is not put in Execution. Such as they are, there are good Store, and as cheap, or cheaper, than in *England*, worth about five *Pounds* apiece. They never *ſhoe* them, nor *ſtable* them in general; yet they ride pretty ſharply: *A Planter's Pace* is a Proverb, which is a good ſharp Hand-gallop. The *Indians* have not yet learned to *ride*, only the *King* of *Pomonkie* had got three or four *Horſes* for his own Saddle, and an Attendant, which I think ſhould in no wiſe be indulged; for I look on the allowing them *Horſes* much more dangerous than even *Guns* and *Powder*.

Wild-Bulls and *Cows* there are now in the *uninhabited Parts*, but ſuch only as have been bred from ſome that have ſtrayed, and become *wild*, and have propagated their Kind, and are difficult to be ſhot, having a great Acuteneſs of Smelling. The common Rate of a *Cow* and a *Calf* is 50 *s.* be ſhe big or little; they are never very curious to examine that Point.

Their *Sheep* are of a middling Size, pretty fine fleeced in general, and moſt Perſons of Eſtate begin to keep *Flocks*, which hitherto has not been much regarded, becauſe of the *Wolves* that deſtroy them; ſo that a Piece of *Mutton* is a finer Treat than either *Veniſon*, *Wild-Gooſe*, *Duck*, *Widgeon*, or *Teal*.

Elks I have heard of, and there are abundance of brave *Red Deer*; ſo that a good *Woodſman*, as they call him, will keep a Houſe with Veniſon. The *Indians*, they ſay, make *artificial* Sorts of *Heads* of Boughs of Trees, which they conſecrate to their *Gods*; and theſe they put on, to deceive the *Deer*, when they go a *Shooting* or *Hunting*, as they call it, and, mimicking the Feeding of the *Deer*, they, by Degrees, get within Shot.

Swine they have now in great Abundance: *Shoats* or *Porkrels* are their general Food; and I believe they are as good as any *Weſtphalia*; certainly far exceeding our *Engliſh*.

Rackoon; I take it to be a Species of a *Monkey*, ſomething leſs than a *Fox*, grey-haired, its Feet formed like a Hand, and the Face too has likewiſe the Reſemblance of a *Monkey's*; beſides, being kept tame, they are very *apiſh*. They are very prejudicial to their *Poultry*, as I remember.

An *Opoſſom*, as big, and ſomething ſhaped like our *Badgers*, but of a lighter *Dun Colour*, with a long Tail ſomething like a *Rat*, but as thick as a Man's Thumb: The *Skin* of its *Belly* is very large, and folded, ſo as to meet like a *Purſe*, wherein they ſecure their Young whilſt little and tender, which will as naturally run thither, as Chickens to a Hen: In theſe *falſe Bellies* they will carry their Young. They feed on, and devour *Corn*.

Hares; many will have them to be a *Hedge-Rabbet*, but I know not what they mean thereby: I take them to be a perfect Species of *Hares*, becauſe I have ſeen *Leverets* there with the *white Spots* in the Head, which the Old ones have not; ſo it is in *England*; and the *Down* is perfectly of the Colour of our *Hares*: They *ſit* as our *Hares* do, and make no *Holes* and *Burrows* in the Earth. True, they are but about the Bigneſs of an *Engliſh Rabbet*, and run no faſter: They generally take into ſome hollow Tree within a little Space, which then the People catch, by gathering the withered Leaves, and ſetting them on fire within the Hollow of the Tree, and ſo ſmoaking of them till they fall down. Sometimes they take long *Briars*, and twiſt them in the Down and Skin, and ſo pull them forth.

Squirrels; there are three Sorts. The *firſt* is the great *Fox-Squirrel*, much larger than the *Engliſh*, and *grey*, almoſt as a common *Rabbet*. Theſe are very common; I have eaten of them at the beſt Gentlemens Tables, and they are as good as a *Rabbet*. The *ſecond* is the *Flying-Squirrel*, of a lighter *dun Colour*, and much leſs than the *Engliſh Squirrel*; the *Skin*, on either Side the *Belly* extended, is very large betwixt the Fore-leg and Hind-leg, which helps them very much in their ſkipping from one Bough to another; that they will leap further than the *Fox-Squirrel*, though much leſs: Yet this is ſtill rather *Skipping* than *Flying*, though the Diſtinction be well enough. The *third* is the *Ground-Squirrel:* I never ſaw any of this Sort, only I have been told of them, and have had them thus deſcribed to me; to be little bigger than a *Mouſe*, and finely ſpotted, like a young *Fawn:* By what I further apprehended, they are an abſolute Sort of *Dor-Mouſe*, only different in Colour.

Muſk-Rats; in all Things ſhaped like our *Water-Rats*, only ſomething larger, and is an abſolute Species of *Water-Rats*, only having a curious *muſky Scent*. I have kept one for a certain Time in a wooden Cheſt; two Days before it died, it was extraordinary *odoriferous*, and *ſcented* the Room very much; but the Day that it died, and a Day after, the *Scent* was very ſmall; yet afterwards the *Skin* was very *fragrant:* The *Stones* alſo ſmelt very well. They build Houſes, as *Beavers* do, in the *Marſhes* and *Swamps* by the Water-ſides, with two or three Ways into them; and they are finely daubed within. I pulled one in Pieces purpoſely to ſee the Contrivance: There were three different lodging Rooms, very neat, one higher than another, as I conceive, purpoſely made for Retirement when the Water riſes higher than ordinary. They are conſiderably large, having much Traſh and Lumber to make their Houſes with. I ſuppoſe they live moſtly on *Fiſh*.

Bats, as I remember, at leaſt two Sorts; *one* a large Sort with *long Ears*, and particularly-long ſtraggling *Hairs*; the *other* much like the *Engliſh*, ſomething larger, I think, very *common*.

I never heard of any *Lions*. They told me of a Creature killed, whilſt I was there, in *Glouceſter County*, which I conceived to be a Sort of *Pard*, or *Tyger*.

Bears there are, and yet but few in the inhabited Parts of *Virginia*; towards *Carolina* there are many more: They are not very fierce. Their Fleſh is commended for a very rich Sort of *Pork*; but the *lying* Side of the *Bear*, as I remember, is but half the Value of the other, Weight for Weight.

There are ſeveral Sorts of *Wild Cats*, and *Poll-Cats*.

Beavers build their Houſes in like manner as the *Muſk-Rats* do, only much larger; and with Pieces of *Timber* make *Dams* over Rivers, as I ſuppoſe, either to preſerve their *Furs* dry in their Paſſage over the Rivers, or otherwiſe to catch Fiſh, by ſtanding to watch them thereon, and jumping upon them on a ſudden. They are very ſubtle Creatures; and, if Half the Stories be true that I have been told, they have a very orderly *Government* amongſt them: In their Works each knows his proper Work and

Station, and the Overſeers beat thoſe young ones that loiter in their Buſineſs, and will make them cry, and work ſtoutly.

Wolves there are great Store; you may hear a Company *hunting* in an Evening, and yelping like a Pack of *Beagles*; but they are very cowardly, and dare ſcarce venture on any thing that faces them; yet, if hungry, will pull down a good large *Sheep* that flies from them.

Foxes; they are very much like *ours*, only their *Fur* is much more *grizled*, or *grey*.

Every Houſe keeps three or four *mungrel Dogs* to deſtroy Vermin; ſuch as *Wolves*, *Foxes*, *Rackoons*, *Opoſſoms*, &c. but they never *hunt* with *Hounds*; I ſuppoſe becauſe there are ſo many Branches of Rivers, that they cannot follow them: Neither do they keep *Grey-hounds*, becauſe they ſay that they are ſubject to break their Necks by running againſt Trees; and any Cur will ſerve to run their *Hares* into a *hollow Tree*.

They have great Store of *Land* and *Water-Tortoiſes*, but they are very ſmall: I think I never ſaw any in that Country to exceed a *Foot* in Length. There is alſo another Sort of *Land-Tortoiſe* different from the common Sort, with a higher ridg'd Back, and ſpeckled with *red* ſort of *Spots*.

Frogs they have of ſeveral Sorts; one of a prodigious Largeneſs, eight or ten times as big as any in *England*, and it makes a ſtrange Noiſe, ſomething like the bellowing of a *Bull*, or betwixt that and the hollow-ſounding Noiſe that the *Engliſh Bittern* makes. Another very common Sort, which they call *Toads*, becauſe *black*; but, I think, differs nothing from our *black Frog*. They have *Toads* alſo like ours in *England*, and another ſmall Sort of *Frog*, which makes a Noiſe like *Pack-horſe-bells* all the Spring long. Another little *green Frog*, that will leap prodigiouſly, which they therefore call the *Flying Frog*. There is frequently heard in the *Woods* a ſhrill ſort of Noiſe, much like that our *Shrew-Mouſe* makes, but much ſharper: I could never learn the Certainty of what it was that made this Noiſe. It is generally in a Tree; and ſome have aſſerted to me, that it was made by the *Green Frog*; yet I ſcarcely believe it. Mr. *Baniſter* aſſured me, it was made by a Sort of *ſcarabeus Beetle*, that is, I think, full as big as the *Humming-Bird*; but neither do I believe that, for this Reaſon; that I never ſaw that *Beetle* ſo low as the *Salts*, but always as high up in the Country as the *Freſhes*; and that Noiſe is frequent all over the Country.

Lizards, that are grey, and very common. The *Snakes* feed much on them; for I have taken ſeveral of them out of the Bellies of *Snakes*.

Snakes, about ſeven ſeveral Sorts. The *Rattle-Snake*, ſo called from certain *Rattles* at the End of the *Tail*; theſe *Rattles* ſeem like ſo many periſhed Joints, being a dry Huſk over certain *Joints*; and the common Opinion is, that there are as many *Rattles* or *Joints* as the *Snake* is Years old. I killed four or five, and they had eleven, twelve, or thirteen *Joints* each; but the young ones have no *Rattles* of a *Year* or two: But they may be known notwithſtanding, being very regularly diced or chequered black and grey on the Backs. The *Old ones* ſhake and ſhiver theſe *Rattles* with wonderful Nimbleneſs, when they are any ways diſturbed. Their *Bite* is very deadly, yet not always of the ſame Force; but more or leſs mortal, accordingly as the *Snake* is in Force or

Vigour;

Vigour; and therefore in *June* or *July* much worſe, and more mortal, than in *March* and *April*. This *Snake* is a Sort of very majeſtick Creature, and will ſcarce meddle with any thing, unleſs provoked; but if any thing offend it, it makes directly at them. An *Indian* being *bit*, by one of theſe *Snakes*, between the Fingers, ſtretched his Arm out as high as he could, calling for a String, wherewith he bound his Arm as hard as poſſibly he could, and clapp'd a hot burning Coal thereon, and ſinged it ſtoutly, whereby he was *cured*, but looked pale a long while after: And I believe this truly one of the beſt Ways in the World of *curing* the *Bite* either of a *Viper* or a *mad Dog*. I was with the Honourable Eſquire *Boyle* when he made certain Experiments of *curing* the *Bite* of *Vipers*, with certain *Eaſt-India Snake-ſtones* that were ſent him by King *James* II. the *Queen*, and ſome of the Nobility, purpoſely to have him try their Virtue and Efficacy. For that End, he got ſome briſk *Vipers*, and made them *bite* the Thighs of certain Pullets, and the Breaſts of others: He applied nothing to one of the Pullets, and it *died* within three *Minutes* and an *half*, as I remember; but I think they all recovered to which he applied the *Snake-ſtones*, though they turned wonderful pale, their *Combs*, &c. immediately; and they became extreme ſick, and purged within *Half* an *Hour*, and the next Morning all their *Fleſh* was turned *green*, to a Wonder: Nevertheleſs, they recovered by Degrees. The Manner of the Application was only by laying on the *Stone*, and, by two croſs Bits of a very ſticking *Diachylum Plaiſter*, binding it on, which he let not lie on paſt an *Hour* or two, took the *Stone* off, and put it into *Milk* for ſome time: Some *Stones* were of much ſtronger Virtue than others. Hereon telling Mr. *Boyle* the Story of this *Indian*, he approved the Method of *Cure*, and ſaid an *actual Cautery* was the moſt certain *Cure*. The *Poiſon*, both of *Viper* and *mad Dog* (as I conceive), kills by thickening the *Blood*, after the Manner that *Rennet* congeals Milk when they make Cheeſe. *Vipers*, and all the *viperous Brood*, as *Rattle-Snakes*, &c. that are deadly, have, I believe, their *poiſonous* Teeth *fiſtulous*; for ſo I have obſerved that *Vipers* Teeth are, and the *Rattle-Snakes* very remarkable: And therefore they kill ſo very ſpeedily by *injecting* the *Poiſon* through thoſe *fiſtulous Teeth* into the very *Maſs* of *Blood*. But the *Bite* of *mad Dogs* is oft of long Continuance before it get into, and corrupt the *Maſs* of *Blood*, being it ſticks only to the Outſides of the *Teeth*; and therefore when they *bite* through any Thickneſs of Cloaths, it rarely proves mortal, the Cloaths wiping the *Poiſon* off before it comes to the *Fleſh*. A *Girl*, that was *bit* about *New-year's-Day*, continued well till *Whitſuntide*; when, coming to ſee certain Friends in our Parts, ſhe fell very ill, and, being a poor Girl, they came to me. It pleaſed God I recovered her: Some time after ſhe returned, to give me Thanks for ſaving her Life, being two Perſons that were *bit* with the ſame *Dog* were dead whilſt ſhe remained under *Cure*; and therefore ſhe was the fuller convinced ſhe owed her Life to me.

But the *Poiſon* of *Vipers* ſeems to be like the *injecting* of Liquors into the *Veins* of *Creatures*. Dr. *Moulin* and I made many Experiments of this Nature together, and I have made many more by myſelf. We once, I remember,

ber, *injected Half a Drachm* of *Alum* into the *Jugular Vein* of a *Dog* before the *Royal Society* (the *Alum* being only diſſolved in a little *Water*), which, within ſomething leſs than *one Minute*'s Time, was ſo abſolutely dead, as not to have the leaſt convulſive Motion; and I have done the like with many other Things beſides *Alum*; but with ſome Things it is more curdled and broken than with others, and will differ much, both as to Colour and Conſiſtence. *Saltpetre* kills much as quickly as *Alum*; but then the *Blood* in the *Heart* looks very florid, ſmooth, and even.

In the little Time I have ſpent in theſe Sorts of Experiments, I eaſily perceive, notable Diſcoveries might be made thereby. One *Dog*, that lived, became *lame* and *gouty*; another with *Quickſilver* died, in about ſixteen *Weeks* time, *conſumptive*; and I diſcovered *Quickſilver* in the impoſtumated Parts of his *Lungs*.

Vid. Sup. *Vol.* III. *Part* I. *Chap.* V. *Sect.* X. 1.

But to return: The *Poiſon* of *Vipers* and *mad Dogs*, I ſuppoſe, kills by *thickening* the *Blood*, as many *malignant Fevers* alſo do; in all which Caſes, I look on *volatile Salts* to be the propereſt *Phyſick*, as keeping the *Blood* from *congealing*. I had a ſingular Inſtance hereof in a Gentleman of *Yorkſhire*, *bit* with a *Greyhound* on the *Thurſday*, not three *Minutes* before the *Dog died mad:* He *bit* him in ſeveral Places of the Hands, as he was giving him a Remedy. The *Monday* following the Gentleman was very ill, and came to *Wakefield* to an *Apothecary*, his Acquaintance, who, knowing not what to do, deſired my Aſſiſtance. When I came, the Gentleman could talk; but every two or three *Minutes* he had violent Fits, and would tell us, when they were over, that his *Brains* worked like *Birm* in an Ale-Fat, and ſeemed to froth up at every Fit. The *Apothecary* had no *volatile Salt* of *Vipers*, ſo I took the *volatile Salt* of *Amber*, and ordered him *ten Grains* in *Treacle-water* every *Half Hour:* He told me, every Doſe ſeemed to clear his *Brain*, and *cool* it as perfectly as if a Baſon of cold Water was poured on his Head, but it returned by Degrees again. Having then a *volatile Salt* by me, that *vomits* very well, I gave him a *Doſe* thereof: It *worked* very well, and he was very much better after it; I then ordered him to continue the *volatile Salts* of *Amber* once every four *Hours*, and at each two *Hours* End (that is, betwixt), *Spec. Pleres Archonticon* and *Rue* powdered, *ana Gr.* 15; whereby he was ſo well recovered, that within two *Days* he would needs go Home, and I heard no more of him for *Half* a *Year*; when I was fetch'd one Morning to him in great Haſte. He had been Abroad, 'played the Good-fellow, and, in his Return home, having rode a great Day's Journey, being wearied, and, I ſuppoſe, finding himſelf indiſpoſed, he ſtayed all Night in our Town, it being fortunately in his Way. In the Morning, when he ſhould have got up, he could not ſtand; whereupon the *Apothecary* was ſent for, and a *Surgeon* to *bleed* him, which was accordingly done, but he grew worſe; for, in this Caſe, I look upon *Bleeding* to be very prejudicial, as well as in moſt *malignant Fevers*; for thereby the *Spirits* are diminiſhed, and the *Blood* congealed the ſooner: When they had done all they could, and the *Symptoms* ſtill increaſed, they at length ſent for me. I never ſaw a Man or Creature in that *Agony* all my Life, that I found him in; ſenſleſs and *mad*, when at beſt, but every *Mi-*

nute the fierceſt *Shiverings* ran through him: His *Eyes* would firſt roll, and then ſet, as if ready to ſtart out of his Head; but, above all, the *Swelling* and *Luxation* at his *Breaſt* was as if he would burſt, which went off with a prodigious *Sigh*. All this I judge the Effects of the *Heart* labouring to diſcharge itſelf of the *ſtagnating Blood*, and the *nervous Convulſions* as Conſequents thereof: And I am the more confirmed in this, from what I ſaw in a *Woman* that was *bit* alſo with a *mad Dog* in the Leg, and fell ill the very Day that ſhe paid the *Chirurgeon* for her *Cure*; and notwithſtanding all that could be done, growing worſe, they ſent for me: I went, and found her with what is called *Hydrophobia:* She would look earneſtly after *Drink* or *Water*, and ſeemed to deſire it; but as ſoon as ſhe began to drink, away it went, be what it would, with the greateſt Violence ſhe could poſſibly fling it. I gave her the *Vomit* hereafter and alſo before-mentioned, but ſhe got but little of it down, and I had no more with me; nevertheleſs, it ſo brought her to herſelf, that ſhe could anſwer Queſtions: And I aſked her, Whether ſhe was afraid of the *Drink* and *Water*, when ſhe flung the Cups in that violent Manner from her? She ſaid, No; but when ſhe offered to drink, her *Breaſt* and *Heart* would not let her. I aſked, Whether through any *Averſion* or *Fear?* She ſaid, No, ſhe was very thirſty; but when ſhe offered to drink, it ſtruck to her Heart, and ſtopped her Breath: That is, as I apprehend, the *cold Drink* paſſing down the *Throat*, ſtruck a *Chilneſs* in the *Blood*, and made it readier to *ſtagnate:* Beſides, the very *Act* of *Drinking* hindering the *free Breathing*, conduced alſo much thereto; and therefore the Heart was ſo ſuddenly oppreſſed, that ſhe could not forbear flinging away whatever ſhe had in her Hand. She complained alſo of a great *Rigour* and Stiffneſs or Streightneſs of the *Muſcles* of her *Breaſt*, ſo that poſſibly the *ſpirituous Liquor* that flows in the *Genus Nervoſum* may be *congealed*, as well as the *Blood*; or the ſame Effects may be ſuppoſed, notwithſtanding, to be the Reſult of the *condenſed Blood* clogging both the *Heart* and *Lungs*, ſo that the Breaſt may ſeem to be ſtreightened therewith. The ſame I judge to be the Cauſe of all the *violent Luxations* in this Gentleman, whoſe Fingers I looked on, and found the Places where he had been formerly *bit* turned *blackiſh*, and much inflamed about them; which confirmed me in my Sentiment, that it was a Relapſe of his former Diſtemper; that is, of the *Bite* of the *mad Dog*. I gave him the former *Vomit* of *volatile Salt*, and he ſhortly after cried, This Fellow in *Black* has done me Good; and, after the *firſt Vomit*, came ſo to himſelf, as to know us all. I *vomited* him every other Day with this *Vomit* for three Times, and made him, in the Interim, to take *volatile Salt* of *Amber*, and the aforeſaid Powders, and to waſh his Hands and Sores in a ſtrong *ſalt Brine*; to drink Poſſet-drink with *Sage* and *Rue*; and by this Courſe, and the Bleſſing of God, his Life was ſaved, and he perfectly *cured:* For it is now four *Years* ſince, and he has had no *Relapſe*. I have cured ſeveral others by the ſame Method.

Col. *Spencer*, the *Secretary of State* in *Virginia*, a very ſerious and ingenious Gentleman, told me, that his Servant brought him word once, that a

Sow having farrowed, a *Rattle-Snake* was got into the Den, and had killed the Pigs: The Colonel went to ſee the *Snake*, which, they ſaid, was ſtill coiled in the Den; there followed them two or three *Mungrel Curs*, and they ſet one of the *Dogs* at the *Snake*, which was too quick for the *Dog*, and ſnap'd him by the Noſe; whereupon he ſet a *bowling*, and ran immediately into the adjacent River, and died very ſhortly after: Another of the *Dogs*, upon the like Attempt, was bit by the *Snake* alſo, and fell a *bowling* and *frothing*, and *tumbling*; but being he died not ſo ſoon as the other *Dog*, they fetched ſome of the *Herb* which they call *Dittany*, as having a great traditionary Virtue for the *Cure* of *Poiſons*: They pounded it, and, adding a little Water, expreſſed the *Juice*, and gave the *Dog* frequently thereof; nevertheleſs, he *died* within a *Day* or *two*. The *bowling* of the *Dogs*, he ſuppoſed, gave Notice to the *Sow*, and made her come furiouſly briſling, and run immediately into her Den; but being likewiſe *bit* by the *Snake*, ſhe ſet up a terrible Squeak, and ran alſo into the River, and there died.

A Gentlewoman told me, that a Neighbour, being *bit* by a *Rattle-Snake*, *ſwell'd* exceſſively; ſome Days afterwards ſhe was ſent for, who found him *ſwell'd* beyond what ſhe thought it had been poſſible for the Skin to contain, and very *thirſty*: She gave him *Oriental Bezoar* ſhaved, with a ſtrong *Decoction* of the aforeſaid *Dittany*, whereby ſhe recovered the Perſon. Aſking him afterwards what he *felt* when the *Snake* firſt bit him, he told me, that it ſeemed as if a *Flaſh* of *Fire* had run through his *Veins*.

Beſides the *Rattle-Snake*, there is the *Blowing-Snake*, an abſolute Species of a *Viper*, but larger than I have ſeen any in *Europe*: It is ſo called becauſe it ſeems to *blow* and ſpread its Head, and ſwell very much before its *Bite*, which is very deadly. It is remarkable, that there is none of their *Snakes* there that make any of that *hiſſing* Noiſe that ours in *England* make, but only ſhoot out their *Tongues*, *ſhaking* them as ours do, without any Noiſe at all.

There is another Sort of deadly *Snake*, called the *Red-Snake*: They are of an ugly *dark-brown* Colour, inclining to *red*: Their Bellies are of a more *dusky White*, with a large Streak of *Vermilion Red* on either Side. This too is of the *Viper* Kind.

The *Horn-Snake* is, as they ſay, another Sort of deadly *Snake*: I never ſaw any of them, unleſs once, ſhortly after my Arrival in that Country, which I cannot atteſt to be the *Horn-Snake*; for I could not diſtinctly view it. It was perched up about two *Foot* high in a *Sumach* Branch, its *Tail* twiſted about the Shrub, and about a *Quarter* of a *Yard* ſtood bolt forward, leaning over the forked Branch thereof. I could not ſee the *Horn* which they ſay it has in its *Front*, wherewith it ſtrikes, and, if it wounds, is as *deadly* as the *Rattle-Snake's Bite*. This, I think, may not improperly be referred to the *Dart-Snake*.

The *Black-Snake* is the largeſt, I think, of all others, but, I am ſure, the moſt common: I have killed ſeveral of them full ſix *Foot* long. Their *Bite* is not deemed *mortal*, but it ſwells, and turns to a *running Sore*. They feed upon *Lizards*, *Mice*, *Rats*, *Frogs*, and *Toads*, which I have taken out of their Bellies. I was once a *Simpling* in the Woods, on a fair Sun-ſhiny Day, when I ſaw a *Snake* crawling on a Tree that was fallen, and *licking* with its *forked Tongue* as it moved: I ſtood ſtill to obſerve it, and ſaw it *lick* up ſmall *Inſects* and *Flies* with wonderful Nimbleneſs, catching them betwixt the *Forks* of its *Tongue*.

The *Corn-Snake* is moſt like the *Rattle-Snake* of all others in Colour, but the *Chequers* are not ſo regular, neither has it any *Rattles*. They are moſt frequent in the *Corn-fields*, and thence, I ſuppoſe, ſo called: The *Bite* is not ſo *venomous* as the *Black-Snake's*. The *Water-Snake* is a ſmall Snake: I never ſaw any of them above a *Yard* long, though I have ſometimes ſeen forty or fifty at once. They are of an ugly *dark blackiſh* Colour. They ſay they are the leaſt *venomous* of any.

An Account of Maryland, *by Mr.* Hugh Jones. *n.* 259. *p.* 439.

XX. *Cheeſepeak-Bay*, which runs N. by W. about 200 *Miles*, or more, divides *Maryland*, as well as *Virginia*, into two Parts, which we call the *Eaſtern* and *Weſtern Shores*: The whole Province contains 11 *Counties*, 6 on our Side, which is the *Weſtern*, and 5 on the *Eaſtern Shore*; the Land is generally *low* on both Sides; no *Hill*, that I have ſeen, or heard of among the Inhabitants, 50 *Yards* perpendicular: But about 100 *Miles* Weſt of us, towards the *Heads* of the *Rivers*, the Ground riſes, and appears in very high *Mountains*, and rocky *Precipices*, running North and South; from the Top of which a Man may have a clear Proſpect of *Virginia* and *Maryland*.

All the *Low-Land* is very *woody*, like one continued *Foreſt*, no Part cleared but what is cleared by the *Engliſh*: And though we are pretty cloſe ſeated, yet we cannot ſee our next Neighbour's Houſe for Trees. Indeed in a few *Years* we may expect it otherwiſe; for the *Tobacco-Trade* deſtroys abundance of Timber, both for making of *Hogſheads*, and building of *Tobacco-Houſes*, beſides *clearing* of Ground yearly for *Planting*. Our *Soil* is generally *ſandy*, free from *Stone*, which makes it very convenient for travelling: And we have no Occaſion for *ſhoeing* our *Horſes*, except in *froſty* Weather. And what with the Goodneſs of our little *Horſes*, and the Smoothneſs of the *Roads*, we can travel, upon Occaſion, fifty *Miles* in a Summer's Afternoon, and ſometimes 100 *Miles* in a Day: Indeed our *Miles* are not accounted ſo long as in *England*. The rich and plentiful Gifts of Nature add much to the Happineſs of the Place; the three Elements affording Plenty of *Food* for the Uſe of Man; *viz. Deer*, *Fowl*, both *Water* and *Land*, in Abundance; and, for the preſerving of *Health*, many excellent *Herbs* and *Roots*, the Diſcovery of whoſe Virtues is chiefly owing to the *Indians*.

We have for *Timber* ſeveral Sorts of *Oak*; *viz.* the *Red*, *White*, *Black*, *Cheſnut*, *Water*, *Spaniſh*, and *Line-Oaks*; which laſt bears a Leaf like a *Willow*: We have alſo *Cedar*, *White* and *Red*; the *Red* ſerves only for Poſts and Groundſils, the *White* to rive or ſplit into *Boards*, that being the freeſt from Knots, and goes under the Name of Cypreſs, but I think falſly. Here is a Tree we call *Cypreſs*, which is extraordinary large in Bulk, and bears a Leaf like the *Senſitive-Plant:* It is ſoft and ſpungy, will not rive, and is fit for no Uſe. We have *Black-Walnut*, which is mightily eſteemed by the Joiners for its *Grain* and *Colour*. Here is a Sort of *Poplar* that makes good white Plank; it is a large Tree, and bears a *Flower* like a *Tulip*. We have alſo Plenty of *Pine*, and *Dog-wood*, which is a fine *Flower-bearing Tree*, *Saſſafras*, *Locuſt*, a Tree of very quick Growth, and very durable in Building; *Hickery*, of which we have two Sorts, *Red* and *White*: This ſerves chiefly for *Fire-wood*, being the beſt for that Uſe. We have alſo Plenty of *Cheſnuts*, and *Chinquapine*, another Species of *Cheſnut*; and a Sort of *Elm*, like a *Dutch Elm*, which we call the *Sugar-Tree*, from the *Sweetneſs* of its Juice, with which ſome have made good *Sugar*. Here is alſo a Sort of *Elder* whoſe Bark is cloſely guarded with *Prickles*, like thoſe of a *Brier*, *Tulip-bearing Laurel*, and *Myrtle* of ſeveral Sorts; one whereof bears a *Berry*, with which they make, on the *Eaſtern Shore*, *Green Wax*, very proper to make *Candles*, if mixed with *Tallow*.

Among the Inhabitants of the *Air*, which are very numerous, the *Humming-Bird* is the moſt curious: They continue with us all Summer, feeding only on *Flowers* like *Bees*; and the *Mocking-Bird*, for *various Notes*, exceeds all the Birds, I believe, in the World.

Of all our *Reptiles*, the *Rattle-Snake* is the moſt noted; and what is commonly reported of its *charming Birds*, *Squirrels*, &c. is not groundleſs; for it hath been affirmed to me by ſeveral Eye-witneſſes.

The *Air* is now more *wholſome* than formerly, which, I ſuppoſe, proceeds from the Opening of the Country; that giving the *Air* a freer Motion. Our *Summers* are not extreme *hot*, as in the firſt Seating; but our *Winters* are generally *ſevere*, towards what they are in *England*. The *North-weſt Wind* is very ſharp in Winter, and even in the Heat of Summer it mightily cools the Air; and too often, at that time, a ſudden *North-weſtern* ſtrikes our Labourers into a *Fever*, when they are not careful to provide for it, and put on their Garments while they are at work.

We have little or no *Woollen* or *Linen Manufacture* followed by any of us, except what is done in *Somerſet County* over the *Bay*; but *Tobacco* is our Meat, Drink, Cloathing, and *Moneys:* Not but that we have *Money*, both *Spaniſh* and *Engliſh*, pretty plenty, which ſerves only for *Pocket Expences*, and not for *Trade*; *Tobacco* being the *Standard* for *Trade*, not only with the Merchants, but alſo among ourſelves. Our common *Drink* is *Cyder*, which is very good, and, where it is rightly ordered, not inferior to the beſt *White Wine*. We have *Wine* brought from *Madera* and *Fayal*; *Rum* from *Barbados*; *Beer*, *Malt*, and *Wines*, from *England*. We have Plenty of good *Grapes* growing *wild* in the Woods, but there is no Improvement made of them.

We are *governed* by the ſame *Laws* as in *England*, only ſome *Acts of Aſſembly* we have, relating to ſome particular Caſes not under the Verge of the *Engliſh Laws*, or where the *Laws* of *England* do not ſo aptly provide for ſome Circumſtances, under which our Way of Living hath put us. The *Church* of *England*, God be praiſed, is pretty firmly eſtabliſhed among us. *Churches* are built, and there is an *annual Stipend* allowed to every *Miniſter* by a *perpetual Law*, which is more or leſs, according to the Number of Taxables in each *Pariſh*, every *Chriſtian Male* ſixteen *Years* old, and *Negroes Male* and *Female* above that Age, pay forty *Pounds* of *Tobacco* to the *Miniſter*, which is levied by the *Sheriff* among other publick Levies; which makes the Revenues of the *Miniſters*, one with another, about 20000 *Pounds* of *Tobacco*, or *One hundred Pounds Sterling* per Annum. It hath been the Unhappineſs of this Country, that they have had no *Proteſtant Miniſters* hardly among them till Governor *Nicholſon*'s Time (who has been a great Promoter and Encourager of the *Clergy*), but now-and-then an *itinerant Preacher* of very looſe Morals, and ſcandalous Behaviour: So that, what with ſuch Mens ill Examples, the *Roman Prieſts* Cunning, and the *Quakers* Bigotry, *Religion* was, in a manner, turned out of Doors. But, God be praiſed, Things now ſtand better, and our *Churches* are crouded as full as they can hold, and the People are pretty ſenſible of the *Roman* Superſtition, and the *Quakers Madneſs*; ſo that their Parties, both joined together, are very inconſiderable to what ours is. Indeed the *Quakers* ſtruggle hard to maintain their Footing, and their *Teachers* (eſpecially the *Female Sex*, who are the moſt zealous) are very free of their Taunts and Contumelies againſt us; but it is to little Purpoſe, unleſs to make their own Way more ridiculous and odious.

We have not yet found the Way of aſſociating ourſelves in *Towns* and *Corporations*, by reaſon of the Fewneſs of Handicraftſmen: There are, indeed, ſeveral Places allotted for *Towns*, but hitherto they are only *titular* ones, except *Annapolis*, where the *Governor* reſides. Governor *Nicholſon* has done his Endeavour to make a *Town* of that. There are in it about forty Dwelling-houſes, ſeven or eight whereof can afford good Lodging and Accommodations for Strangers. There is alſo a *State-houſe*, and a *Free-ſchool*, built with *Brick*, which make a great Shew among a Parcel of wooden Houſes; and the *Foundation* of a *Church* laid, the only *Brick Church* in *Maryland*. They have two *Market-days* in the Week; and had Governor *Nicholſon* continued there ſome *Years* longer, he had brought it to ſome Perfection.

As for our Predeceſſors, the *Indians*, I cannot give you, at preſent, any further Account of them than this; *viz.* That whereas, at the firſt ſeating of *Maryland*, there were ſeveral Nations of *Indians* in the Country, governed by ſeveral petty *Kings*; now I do not think that there are five hundred *fighting Men* of them in the Province, and thoſe are moſt on the *Eaſtern Shore*, where they have two or three little *Towns*. Some of them come over to our *Side* in Winter-time to *hunt* for *Deer*, being generally employed by the *Engliſh*. They take Delight in nothing elſe; and it is rare that any of them will embrace our Way of *Living* or *Worſhip*. The Cauſe of their *diminiſhing* proceeded not from any *Wars* with the *Engliſh*, for we have had none with them; but from their own perpetual Diſcords and *Wars* among themſelves. The *Female Sex* alſo have ſwept away a great many; ſo that now they are dwindled almoſt to nothing. One thing is obſervable in them, though they are a People very *timorous* and *cowardly* in *Fight*; yet, when taken *Priſoners*, and condemned, they will *die* like Heroes; braving the moſt exquiſite *Tortures* that can be invented, and *ſinging* all the time they are upon the *Rack*.

XXI. The *Gramen Iſchæmon*, called by others *Gramen Dactyloides*, or *Sanguinella*, and the *Gramen Aquaticum cum Longiſſima Pannicula*, mention'd by *Bauhinus*, grow here (about *Frankfort on the Oder*), in great Plenty. In the *Foreſt* called the *Hartz* there are very conſiderable, both *Copper* and *Silver Mines*, Store of *Lapis Fiſſilis*, and a Sort of *Stone* which, by *Rain*, grows altogether *ſoft*; and a Place called *Bowman's-Hole*, like that of *Oky-Hole* about *Wells* in *England*.

Obſervables near Frankfort on the Oder; *by* Joh. Chr. Beckman. *n.* 39. *p.* 773.

XXII. *S. Borelli* pretends to have lighted upon a Way of building *Gallies* with ſeveral *Tires* of *Oars* of different Heights, which he eſteems to be more convenient, more ſpeedy, and ſtronger, than thoſe that are now in uſe. He thinks alſo, that he can give an Account of the Poſſibility of the *Gallies* of the *Antients* to a determinate Number of *Tires*.

There is at *Rome* a Bowl, which is ſo counterpoiſed, that it can ſtop of itſelf upon an inclining Plane, like *Kepler*'s Watch: It ſtops upon all Sorts of Matter, and even upon a *Looking-glaſs*.

Some Communications from Italy; *by* ... *n.* 114. *p.* 309.

XXIII. I took Notice, in the Univerſity of *Bononia*, of this *Inſcription*, made in Commendation of the deſervedly-famous *Malpighi*: It is in the upper Gallery, in a large *Baſis* painted in *Freſco*, with ſome *Figures* about it.

Obſervations in Italy; *by Dr.* Pet. Silveſter. *n.* 265. *p.* 627.

D. O. M.

Virtuti & Famæ in Ævum manſuræ Inclyti Viri M. Malpighii, Medicinæ Profeſſoris Celeberrimi, utraque Artiſtarum Univerſitas P. Anno Salutis 1683.

And a little lower,

Miraris Breve Lemma? Nomen Ingens Ornari negat: eſt ſatis Referri. Juſſum Cætera tacere Marmor. Omnis Malpighium Loquetur Ætas.

I have made ſome Obſervations upon the *Bronchocele*, a Diſtemper very frequent all over *Lombardy* and *Savoy*. By the Diſpoſition of this *Tumor*, I am ſatisfied it has principally its Seat in the *Glandulæ Thyroideæ*, and ſometimes too, but very ſeldom, in the *Parotis Conglobata*: I could plainly ſee the *Parotides Conglomeratæ* were no wiſe concerned. This I have obſerved, in ſeveral *Bronchoceles*, of a very great Bigneſs. I conceive theſe *Tumors* (that are generally attributed to the *Water* the People drink, that is, *melted Snow*) do proceed *a Lentore Lymphæ*, which, by degrees, extend the *Folliculi Glandularum Membranoſi*, and, being there congealed, hardens them to that Degree, that an inveterate *Bronchocele* is almoſt like a *Stone*. But why theſe *Swellings* are to be ſeen no-where elſe but in theſe

Glands of the *Neck*, it is difficult to give a good Reaſon: It may be the natural Conformation of the *Glandulæ Thyroideæ* (which being harder, and of a more ſolid Subſtance than other *Glands*, give ſooner a Stop to the *Lympha Lenta & Viſcida)* is the Occaſion of this *Tumor*'s always beginning and ſettling there.

The *Sal Montis Veſuvii* is found, in pretty large Lumps, after Mount *Veſuvius* has ſpewed out a vaſt Quantity of *Aſhes:* The great Rains that fall upon theſe *Aſhes* make a Sort of *Lees*, which, left in the hollow Places, are evaporated by the Heat of the Sun, and there remains this *urinous Salt*, whoſe *Taſte* is ſomething like *Sal Ammoniac*.

At the *Sulfatara*, between *Naples* and *Puzzolo*, they make *Alum* in this Manner: In Summer-time they gather as much as they have Occaſion for of an *Earth* that is there in the Middle of a large *Area*, and they keep it in a *dry* Place; they put it in *Lead Coppers* of a good Thickneſs, and pour upon it *Rain-water*, which is alſo impregnated with the ſame *Mineral:* For that Purpoſe they take great care to dig ſome large Holes, to preſerve in them the Rain-water; and they carry it to a large Ciſtern by the *Coppers*. They take away the *Earth* when the *Lixivium* is made, and, as it grows ſtronger by Evaporation, they put it from one Copper into another, till it is ſufficiently evaporated; then they take it out, and convey it into a *wooden Tub*, where, after it is cooled, you ſee the *Alum* ſtick to the Sides, in the Form of *Cryſtals*. But the moſt remarkable Thing is, that theſe *Coppers* are placed upon ſome of the great *Spiracula*; and that, without any Expence in *Fuel*, only by the *violent Heat* of theſe *Effluvia*, the Evaporation is conſtantly made ſufficient for that *Cryſtallization*. All this *Laboratory*, where are the *Coppers* and the *Ciſtern*, with the *Tubs*, is only tied over. The Governors of the great *Hoſpital* of the *Annunciata*, who have been at the Charge of this ingenious Contrivance, do make now about 3 or 400 *Pounds* a *Year* by it.

All Summer long ſome Labourers dig up and down, in ſeveral Places of the ſame *Area*, as if it was in a Kitchen-garden; and by thoſe Means they give way to the copious *ſulphureous Steams* that are within the Bowels of all this Mountain: Then out of the Superficies of that *Earth*, by the means of *earthen Pots*, they *ſublime* the *Brimſtone*.

At the Mouth of the largeſt *Spiracula*, where is an exceſſive *Heat*, and continual *Noiſe* and *Smoke*, is found a Sort of *native Sal Ammoniac:* It ſeems the copious *Steams* come out in *Forma Liquida*; for if you put in a Key, or a Sword, or any thing ſolid, theſe *Effluvia* will ſtick immediately to it, and drop down like Water. All this Mountain ought to be extraordinary full of *mineral* Subſtances; for we ſee theſe *Effluvia*, when they are *ſublimed* to the Top of the *Spiracula*, do ſtick there to Tiles or Stones, where they form [illegible] *Salt*, of which they gather *yearly* about Two Hundred *Pounds* Weight. It has much of the Taſte of the *factitious Sal Ammoniac*; and, as a learned Phyſician told me, being *diſtilled* in a *Sand Furnace*, it yields a *volatile urinous Spirit*, abſolutely like *Sal Ammoniac*, as to the ſenſible Qualities, and all other Effects: He only obſerved, that *Spirit* had ſomething *aluminous* in it; and that, to correct it, they uſed to add a greater Quantity of *Quick Lime*, or *Sal Tartari*, than in the *common Spirit's* Diſtillations.

XXIV. 1. There is an Hill nigh *Sarvizza*, two Days Journey on this Side *Lariſſa*, which conſiſts of an *Earth* of a fine *red* Colour, out of which the *red earthen Veſſels* of that Country are made; as alſo a great Number of *Acidulæ* nigh *Tranſchin* in *Hungary*, there being 32 plentiful Springs of them; likewiſe an *Hot Bath* nigh *Bellachergua* in *Bulgaria*, ſituated far from any Habitation, yet well built by the *Turks*, and very refreſhing to Travellers: It hath a *red Sediment*, and maketh a *grey Stone*.

Obſervations in Turky; *by Dr.* Edw. Brown. *n.* 59. *p.* 1051.

Being at *Lariſſa* in *Theſſaly*, where the *Grand Seignior* hath long reſided, I underſtood that he had paſſed a good Part of the hot Summer of 1669. upon the neighbouring Mount *Olympus*; and by the Interpreters to the *Emperor*'s Reſident, the *Illuſtriſſ. Signor di Caſa Nova* (who were obliged to attend the *Sultan* upon the Mountain), I was informed, that there was a *Spring* of *whitiſh Water* upon that Hill, which was drank of by many Perſons in the great Heat and Thirſt contracted by aſcending the Mountain, but proved very deſtructive to them in three *Days*; they then complaining of an Heavineſs, and Coldneſs of their *Stomachs*, till they died.

2. There is a Diſeaſe which reigns in the Country about *Aleppo*, and as far as *Bagdat*, invading both *Sexes*, all Sorts of *Ages*, and Strangers, as well as Natives: 'Tis commonly called *Il Mal d'Aleppo*, and appears to be in the *Skin* a ſmall *Puſtula* or *Wheal*, hard and red, the Head whereof is ſcarce bigger at the Beginning than the Point of a Pin; afterwards growing bigger, and being nouriſhed by five or ſix little Roots or Fibres, it goes on to its Height for the Space of about ſix *Months*, and in as many more comes to its Declination; ſo that the whole Period of this *Diſeaſe* is generally comprized within the Space of one *Year*. But this *Puſtula* hath hitherto yielded to no *Remedies*, neither in the Beginning, Middle, or Declination; but hath rather been exaſperated by them, though they were *Anodyna*. It is wholly to be left to Nature; and, if you do, there is no Pain or Trouble in it. It takes People not once, but often; and it ſeizeth on ſeveral Parts of the Body; and if it do ſo on the Face (as often it doth), it cauſes a remarkable *Scar*, which yet, by little and little, vaniſheth.

By . . . . . *n.* 59. *p.* 6017.

As to *Fevers* at and about *Aleppo*, though they have the ſame *Type* there as in *England*, yet there are two Things peculiar in them: One is, that, in *acute Fevers*, *cold Sweat* commonly ſignifies *Recovery*; but *hot Sweat* portends *Death*: The other is, that, in ſuch *acute Fevers*, even an *intermitting Pulſe* denounces no *Danger*.

Touching the *Leproſy*, which was antiently ſo frequent a Malady in theſe Countries, it is now ſcarce to be found there; though at *Damaſcus* there is ſtill an *Hoſpital* ſtanding, formerly built for the Relief of Perſons thus diſeaſed.

As for the Reaſon why the City of *Conſtantinople* is ſo much ſubject to the *Plague*, ſome are of Opinion, that the Multitude of *Slaves*, yearly brought by the *Black-Sea*, and their hard Diet and Uſage begets this Corruption. Others judge, that the Commonalty there, feeding, for the greateſt Part of the Summer, on *Cucumbers* and *Melons*, and drinking Water upon them, without the Uſe of Helps to correct the Crudities, fall into *malignant* and *peſtilential Fevers*. But the Phyſicians generally conclude, that the *Air* of *Conſtantinople* is infected by the *North-Eaſt Winds*, which blow commonly for three *Months*, beginning about the *Summer Solſtice*, ariſing from unwholſome Marſhes in *Tartary* and *Muſcovy*, and, paſſing over the *Black-Sea* (a Place known to abound with *Fogs*), bring with them certain Diſpoſitions tending to Corruption; which, working upon Bodies already prepared by bad Diet, may well be judged, they ſay, to be the Cauſe of this Diſtemper.

Beſides the other Uſes of *Opium* in *Turky*, it is common, in *Arabia*, to cure Horſes, with it, of the *Griping* of the *Guts*.

As to the *Turky* Way of *dreſſing Leather*, it is to be obſerved, that their *Leather* is nothing ſo ſtrong and ſerviceable as that in *England*; an aſſur'd Proof whereof is, the wearing. And though it be commonly reported, that the *Leather* in theſe Parts, though thin and ſupple, will hold out Water; yet this is to be underſtood, that the *Turks*, in their *Winter-boots*, between the Lining and the Leather put a *Sear-cloth*, which, being curiouſly ſewed in the Seams, will keep out Water, though you put them in it for divers *Hours* together. In cleaning of their Leather, they uſe *Lime* and *Album Græcum*, and, inſtead of *Bark* of *Trees*, they employ *Valonia*, a Sort of *Acorn* growing on the *Oaks*. I am perſuaded that our *Acorns* in *England*, if they could be ſpared for it, would perform the like Effect, and perhaps better, ſeeing that, many Times, the *Valonia* burns the *Leather* ſo much as to make it little ſerviceable; whereas our *Acorns* are, probably, more temperate, and ſo might better ſerve the Turn.

Medical *Obſervations in the* Northern Counties; *by Dr.* Phil. Lloyd. *n.* 256. *p.* 310.

XXV. *Baths* are no-where more frequent than in *Lithuania*. Upon going into the *Bath*, after having ſweated plentifully, they have *Cupping-glaſſes* applied to them, or their Backs beat with Rods till they become very red. Amongſt the *Coſacks*, likewiſe, if a Perſon is very lame, he is put into the *Bath*, and his Body covered with certain *Herbs*; and they apply to the Part pained a kind of *hollow Horn*, in order to raiſe a *Bliſter*, which being broke, there flows out an *Ichor* frequently of different Colours, yellow, green, and black; and the Patient recovers. But that Variety of *Colours* muſt be owing to the Herbs with which the Patient is covered, or to the Horn's being beſmeared with ſome kind of *Dye*. A great Remedy amongſt the *Coſacks* is *Aqua Vitæ*, or ſour Broths, with Oil and Pepper, to promote Sweating; neither do they abſtain from Meat boiled with Vinegar and Onions, which they call *Bigoſt*. But as *Pharmacy* is not in much Eſteem amongſt theſe People, ſo, on the contrary, they are very fond of *chirurgical* Remedies; ſuch as *Bleeding*, the Uſe of *Leeches* (which they apply even to the *Palate* and *Gums*), *Iſſues*, and the *Trepan*; the Uſe of which is very frequent and ſucceſsful in *Sweden*; for the *Swedes* have Heads very hard and hairy. Amongſt the *Muſcovites*, upon account of their Neighbourhood with *China*, the Uſe of *Tea* is frequent, not only in Decoction, but in Powder, taking it to the Quantity of Half a *Drachm* in *Aqua Vitæ*.

Theſe People likewiſe uſe certain odoriferous little *Balls*, of a yellow Colour, which they put up the *Noſe*, to the Quantity of four *Grains*, keeping the *Mouth* open: For two Hours ſuch a Quantity of *viſcid Mucus* flows out, as could ſcarce be evacuated by means of any *Cathartick*; and with this they cure all Diſeaſes of the Head proceeding from a cold Cauſe. Some draw up the Smoke of *Tobacco* from a large Tube, ſwallowing as much of it as they can; which makes them fall down as in the Fit of an *Apoplexy*; but they are ſoon rouſed again with Vomiting and Purging: And although this ſhould not happen (which is ſometimes the Caſe), yet, after they awake, they find their Heads eaſy, and they are every way very well.

The *Tartars*, uſed from their Infancy to *Milk* and *Horſe's Fleſh*, ſeeking their *Medicine* chiefly in continual Riding, make uſe of very few internal Remedies, ſome external, and theſe very *quackiſh*. For Example; if a Perſon is taken very ill, and they ſuſpect a *malignant Fever*, they take a *Leveret*, and cut the *carotid Artery*, and the Patient ſucks out *Blood* as long as he can; then the *Skin* is taken off, and laid warm over his Head, and he is put to-bed to *ſleep* and *ſweat*. When any of the *Slaves* or *Servants* is taken ill of a *Fever*, they catch hold of him by the Hair, ſhake him, whirl him round, and throw him into running Water; and in this Manner, by altering the Courſe of the Humours and Spirits, they procure a *Febrifuge*.

Theſe Accounts I had from a Friend in Camp, who lived a long while in thoſe *Northern* Countries. To crown the Whole, he told me (let whoever pleaſes believe it), that in *Lithuania*, eſpecially, they are ſubject to a *Faſcination*, communicated only by the Look; where Men, by the ſubtil *Effluvia* from the Eyes, not only hurt others, but likewiſe brute Animals. This Diſeaſe, or whatever you call it, is named *Uroki*; and, in order to produce it, the Bodies muſt be placed very nigh one another, and the one muſt not ſtand any higher than the other. They are cured chiefly by *hot Baths*, prepared with *Origanum*, *St. John's-wort*, and other Herbs; by *Fumigation* of the *Hair*, *Nails*, and other Parts of the *Inchanter*, if they are to be had; and, laſt of all, by *Sweats*.

Amongſt the *Tartars*, if any one is much hurt by a Fall from a Horſe, or otherwiſe, in the firſt Place, they force him, as much as poſſible, to make *Water*; then, after *bleeding* him, they give him to drink burnt Horſe's Bones, and a kind of *white Bole*, in which that Country abounds.

Mare's Milk, made *ſour*, is with them an univerſal Cooler in all hot Diſeaſes; nay, a *ſtomachick Balſam*.

In the *Small-Pox* in Children, the *Muſcovites*, inſtead of *Bleeding*, uſe *wet Cupping* on the Hips, and frequently *Leeches*: They prepare *Emulſions* of *Turnep-ſeed*, and give them *Album Græcum* in their Drink.

The *Polanders* have a certain kind of nouriſhing Medium, which they make great uſe of, and is called *Barſt*: By its gentle Acidity it pleaſantly recruits the Ferment of the Stomach, and is very uſeful to theſe People in

Crapulas, after drinking largely of *burnt Mead*, or *ſtrong Wine*, or eating plentifully of heating Diſhes. This kind of eatable Medicine they prepare of *Bearsfoot*, or of fine white Bread only, fermented after their Manner, in the Form of a watery herbaceous Decoction.

But if any one is taken ill, and complains of a *violent Head-ach*, *Gripes*, the *Wandering Gout*, &c. immediately they begin to ſuſpect the *Plica*, or *Koltum*; and all they endeavour to do is, to bring it out upon the *Hairs* of the *Head*, which they do by a Lotion of *Bearsfoot* and other Herbs, or at leaſt by waſhing the Head frequently with a Mixture of *Oil* and *Wine*. The *Plica* being thus forced out upon the *Head*, the Diſeaſe ſeems to grow milder, the morbifick Matter being thus critically tranſlated, and the reſt is wholly left to Nature: Which plainly ſhews that this Diſeaſe is owing to ſomething elſe than neglecting to comb the Head. For if any one tries to cut off the Hair, or pull it out with the Comb, he falls into another Diſeaſe, and the *Blood* frequently flows from the Hairs that are cut, as from the ſmall Branches of a *Vein*. Nor ought this to appear ſurpriſing, ſeeing the Hairs are form'd of little Branches of an *Artery*, *Vein*, and *Nerve*, incloſed in a common *Capſula*, and afterwards lengthened out; as is plain to the Eye, by the Help of a *Microſcope*, in the Hairs of the *Beards* of *Cats*, and other Animals.

Whatever Authors have wrote concerning the Cauſe of the *Plica*, is either too general, or imperfect, and inſufficient: For as to the Waters in *Ruſſia*, though you were certain that it was occaſioned by drinking of them; whence, too, when an Army is marching through theſe Parts, there are Centries poſted at the Fords of the Rivers to hinder the Soldiers from drinking the Waters; I would aſk, How thoſe People who live an Hundred Leagues diſtant, and more, from that Country, come to be ſubject to the *Plica?* Unleſs they can perſuade us, that that Water is diſtributed, by proper Veins, from *Ruſſia* to the whole Kingdom of *Poland*.

The intrinſick Cauſe may be placed in the ſubcutaneous *Glands*, by which ſeveral of their Ducts and Pores are conjoined and oblique, from which a greater Number of *Hairs* growing upon a narrower Surface, aſſiſted at the ſame time with the too viſcid Juice of the *Glands*, are plaited and twiſted with one another: But as that Cauſe may happen elſewhere, as well as in *Poland*, it is not ſufficient to account for a Diſeaſe which is peculiar to that Country alone. Wherefore the true Cauſe is partly to be attributed to *Contagion*, and partly to the Abuſe of the *Nonnaturals*. There is no-body doubts of a *Contagion* there, ſeeing it is uſual for Travellers in that Country to carry their Beds along with them. The Air is very piercing, abounding with a coagulating *Acid* from the *North*; whence that thick glutinous Fluid ſticking at the Roots of the *Hairs* is hindered from flying off, eſpecially as the *Poles* uſe frequently to walk with their Heads uncovered.

They who are ill of this Diſeaſe have their Appetite fixed upon a certain Object: Some deſire nothing but Water, others *Crematum*, rejecting other Liquors; and they find Relief in the Scurvy from the ſame Remedies.

Beſides the *malignant Hungarian Fever*, as it is called, there are other *endemical* Diſeaſes, of leſſer Note; as the *Czemer*, *Porcellus Caſſovienſis*, and *Strumæ*.

The *Czemer* is a kind of Tumor on the Sides of the *Wriſts*, above the *Arteries*, like a ſoft kind of Knot, painful to the Touch. It is cured with *Emeticks* and *Sudorificks*.

The *Porcellus Caſſovienſis* is a hard Tumor, like a *little Pig*, lying upon the Region of the Spleen, very frequent amongſt the Inhabitants of the Country about *Caſſaw*; and is a ſcirrhous Diſpoſition of the *Spleen*, attended with Flatuſes in the *Colon*. It is cured by *Aperients*.

There are no *ſtrumous* People in *Hungary* except in the mountainous Parts of it, where are the *Gold Mines*, owing to the *mercurial Waters*, and *mineral Effluvia*. In the Waining of the Moon the ſtrumous People receive the Smoke of burnt Spunge by the Mouth, and the Aſhes they ſwallow mix'd with Honey in the Beginning of the Diſeaſe; for your inveterate *Strumæ* admit of no Cure.

An Account of Iceland; *by Dr.* Paulus Biornonius. *n.* 111. *p.* 238.

XXVI. In *Iceland* our *Air* is very healthy all the Year long. The Diſeaſes which the Inhabitants are moſt ſubject to are, the *Cholick* and *Leproſy*. We have no *Phyſicians*; only two or three *Chirurgeons*, that furniſh us with ſome Plaiſters for the dreſſing of Wounds. In our *Air* Iron *ruſts* very ſoon.

The Changes of the *Weather* are uncertain, nor do they fall out according to the four Seaſons of the Year: Sometimes it *ſnows*, as well as it *hails*, in the midſt of Summer; and the Winds blow now-and-then moſt furiouſly at the ſame Seaſon.

As to the *Froſt*, it penetrates, at moſt, four *Foot* into the Earth; *Spirit of Wine* and *Oil* are free from being *frozen*, much more *Quickſilver*. We preſerve our *Fiſh* from Putrefaction by burying them in the *Snow*. Bodies *frozen* do ſwell, and are changed in Taſte and Colour. The Figure of the *Snow* is various, and ſo is its Size: *Hail* is roundiſh; the greateſt is only of the Bigneſs of Hail-ſhot, that we kill Fowl with.

Of *Meteors*, I have obſerved the *Ignis Lambens*, the *Draco Volans*, and frequently two *Mock Suns*, with three *Rainbows* paſſing through them and the *true Sun*. We have no *ſtated Winds*.

The *Depth* of our *Sea* varieth; the greateſt about our Coaſt is eighty *Fathoms*. Our *Sea-water*, in clear Nights, being ſtruck with Oars, *ſhineth* like Fire burſting out of a Furnace. The *Tides* obſerve the Motion of the *Moon*; the Sea *ſwells* about the *Moon's Riſing* and *Setting*, and it *falls* when ſhe is *Southerly* and *Northerly*. The ordinary *higheſt Tides* are not above ſixteen *Foot*, except in *Autumn*, when it is very tempeſtuous; and then they *riſe* ſometimes to twenty *Foot*. About the *Full* and *New Moon* are the higheſt *Spring-tides*, and the loweſt *Ebbs*.

As for *Lakes* and *Springs*, of the former we have very many, and moſt of them on high Mountains, which are ſtored with *Salmons*; of the latter we have innumerable guſhing out of Rocks: We abound alſo with *Hot Springs*, of which ſome are ſo *hot*, that, in a *Quarter* of an *Hour*, they will ſufficiently *boil* great Pieces of *Beef*; which is thus ordered: They hang the Kettles, with cold Water, over them, in which they put the Meat to be *boiled*, for fear of either burning or throwing up the Meat by the fervent and vehement Ebullition of the *hot Waters*. Theſe Waters do harden and *petrefy* about the Brims of the *Thermæ*.

Our *higheſt Hills* are not above a *Quarter* of a *German Mile* high, which how I have meaſured, I ſhall give an Account of hereafter. There is a whole Ridge of *Mountains* through all the Iſland. Our People live only in the Valleys, and towards the Sea-ſhore. There are other *ignivomous* Mountains beſides *Hecla*, yet all covered with *Snow*.

The *Declination* of the *Loadſtone* is here to the *North weſt*.

Our *Soil* is *clayey*, for the moſt part; in ſome Places *ſandy*, no-where *chalky*. No *Tillage* at all; we are ſerved by imported Commodities, of which the chief are, *Barley*, *Wheat*, *Linen*, *Iron*.

Touching *Animals*, we have great Numbers of divers Birds in Summer; in Winter, *Ravens*, *Eagles*, *Wild Ducks*, *Swans*.

We are pretty well ſtored with *Horſes*, *Oxen*, *Cows*, *Sheep*, *Dogs*, and, in ſome Places, with *Hens*. *Foxes* there are in the Mountains; and when the *Greenland Ice* comes upon us, that brings with it thoſe terrible Gueſts that do us ſo much Miſchief; I mean, a great many *Boars*. Our *Oxen* and *Cows* live in Winter upon *Hay*, but our *Horſes* and *Sheep* make a Shift to live upon the *Graſs* under the *Snow*, and the *Coralin Moſs*, called *Muſcus Marinus*.

We have no *Minerals*, that we know; only Store of *Brimſtone*, of which we ſend out every Year two Ships Lading.

In the Year 1642. on the 13th of *May*, all the Sea, which beats upon our Promontories, was for two Days ſo *pellucid* and ſhining, that Shells, and the leaſt Stones, could be ſeen at the *Bottom*, where the Sea was forty *Fathoms* deep; inſomuch that the ſaid Objects ſeemed to be no further than three *Foot* diſtant from the Sides of our Fiſhermens Boats; who, when they ſaw it, were ſo frighted at it, that they preſently came in, and noiſed this all over the Country. It began in the Morning about Nine of the Clock; and the Whole is witneſſed by divers very honeſt and credible Men.

A ſummary Relation of the Diſcoveries about the North-eaſt *Paſſage; by* ... *n.* 118. *p.* 417.

XXVII. It is ſufficiently known how ſtudiouſly and ſolicitouſly the Lords of the *United Netherlands* have laboured to encourage thoſe that ſhould firſt diſcover a more compendious and ſhorter Paſſage by the *North* to *China*, *Japan*, and other *Oriental* Countries: But thoſe who *firſt* adventured upon this Enterprize found, by ſad Experience, that the Succeſs anſwered not their Expectation and Hopes.

Thoſe who immediately *ſucceeded* them in that Adventure were not much more ſucceſsful; for, treading the ſame Steps that the former had done, they were involved in the ſame Difficulties; for they were all miſled by an Opinion, that that Part of the Sea which lieth betwixt *Nova Zembla* and the Continent of *Tartary* had been *paſſable*, and that they might have ſailed through that to *China*: But the Arm of the Sea, into which Men paſs through the *Streights* of *Weygatz*, is too ſtrongly bound up by the Froſt, eſpecially in the Winter-ſeaſon: Nor ought any Man to wonder why the Navigation of *Will. Barentz* (otherwiſe a well-experienced Mariner) was unſucceſsful, who paſſed along the *Coaſt* of *Nova Zembla*, as far as the 77th Degree of *Northern Latitude*. For it is well known to all that ſail northward, that moſt of theſe northern *Coaſts* are *frozen* up many *Leagues*, tho' in the *open Sea* it is not ſo; no,

Vid. ſup. *Vol.* I. *Chap.* VIII. *Sect.* XXXIII.

no, not under the *Pole* itſelf, unleſs by Accident: As when, for example, upon the Approach of the Summer, the *Froſt* breaketh, and the *Ice*, which was congealed near forty or fifty *Leagues* to the *Shore*, breaks off from the Land, and *floats* up and down in the Sea; whereby ſeveral have been forced to quit their Deſign, and ſtand back for their own Country.

There was, ſome Years ſince, a Knot of Merchants of *Amſterdam*, who attempted thoſe Seas with much better Succeſs than the former: For being advanced to the 79th or 80th *Degree* of *Northern Latitude*, they paſſed above an *Hundred Leagues* above *Nova Zembla* toward the *Eaſt*: And, though they gave ſtrict Charge to conceal what they had ſeen and obſerved, yet it became publickly known, that they had diſcovered a Sea, beyond *Nova Zembla*, free from all Ice, and very convenient for Navigation.

Theſe, being returned to their own Country, with great Hopes of finding Encouragement to make further Diſcoveries, petitioned the Lords the *States-General* of the *United Provinces*, that ſince they had granted the Trade of almoſt all the World to the Governors of the *Eaſt* and *Weſt-Indian Companies*, and that there remained ſcarce any thing to the reſt of the Merchants beſides the Trade of the *Mediterranean* and *Baltick Seas*; they would be pleaſed to grant the Navigation of the *Northern Seas*, and of the *Eaſtern* (not yet diſcovered), to them, excluſive, to the *Eaſt* and *Weſt-Indian Companies*. But the Governors of the *Eaſt-Indian Company*, being ſenſible how nearly this concerned them, preſented likewiſe their Croſs-Petition, deſiring, That the Petition of the ſaid Merchants might for the future be referred to them, and their Conſideration.

The Merchants, finding their Petition thus croſſed, addreſs themſelves to the King of *Denmark*, who immediately granted their Demands. Under his Protection, therefore, they equipp'd two or three Ships, ſuch as they judged moſt proper for this Voyage; which when the *Governors* of the *Dutch Eaſt-Indian Company* had Information of, they raiſed a conſiderable Sum of Money, and eaſily perſuaded the Mariners to deſiſt from ſo dangerous (for ſo they repreſented it) a Voyage: And yet, that the Merchants might have no juſt Cauſe to complain againſt the ſaid *Company*, the Mariners went to Sea; but, neglecting the Directions and Orders of thoſe Merchants, they ſteered their Courſe directly for *Spitzberg*, took in their Lading of *Fiſh*, and return'd Home.

Upon which, the *Eaſt-Indian Company* of the *United Netherlands* omitted neither Study nor Care to find out a Paſſage through the *North-eaſtern Sea* for thoſe that were to return into *Europe* from the *Eaſt-Indies*. There was then much Diſcourſe of the *Gulph* of *Anian*, by which a Paſſage was ſaid to be open into the *Tartarian Sea*; and ſomething they underſtood from the People of *Japan*, and the *Portugueſe* of the Country of *Jezzo*, which lay above *Japan*. But, not reſting ſatisfied with the bare Relation, in the Years 52. and 53. they ſent out ſome dextrous Perſons to diſcover thoſe Coaſts; who, paſſing beyond *Japan*, in the 50th *Degree* of *Northern Latitude*, arrived upon the Coaſt of *Jezzo*, where they fell into a narrow Sea, yet broad and convenient enough to lead into the *Northern Ocean*. The oppoſite Shores they called *Het Compagnie*

Land,

Land, and an Iſland ſeated in the Middle of the *Gulph* they called *Het Staten Eyland*.

Whether this *Land* of *Jezzo* be annexed to *Japan*, or not, the Inhabitants of both Countries doubt, becauſe vaſt and inacceſſible *Mountains* interpoſe, which hinder the Communication: Neither doth it, as yet, clearly appear, whether this Land of *Jezzo* is a Part of *Tartary*; or whether, by an Arm of the Sea, divided from it. The *Chineſe* affirm, That *Tartary* runs 300 *China Leagues* eaſtward beyond their famous *Wall:* So that, if we follow theſe, the Country of *Jezzo* and *Japan* may ſeem to be annexed to *Tartary:* But thoſe of *Jezzo* ſay, That there runs an Arm of the Sea betwixt them and *Tartary:* Which Opinion may ſeem to receive ſome Confirmation from what theſe *Hollanders* affirm who ſhipwreck'd (ſome Years ſince) upon *Corea*, a *Peninſula* of *China*. They ſay, they ſaw there a *Whale*, upon whoſe Back ſtuck a *Harping-iron* of *Gaſcony*. And the Credit of this Aſſertion not being queſtioned by any, it is moſt probable to be conjectured, that this Whale paſſed from *Spitzberg* through the neareſt Arm of the Sea, rather than through the more remote. Be it how it will, we may hence ſafely conclude, that the Sea which lies beyond *Japan* and *Spitzberg* is *paſſable*, and that through more, perhaps, than one Arm or Chanel, by which they communicate.

But to go on: After the Experiments made by the Governors of the *Eaſt-India Company*, in the *Years* 52. and 53. they reſolved to proceed no farther upon the Diſcovery; as well becauſe the Emperor of *Japan* interdicted the Navigation of Foreigners into *Jezzo*, in regard (as they ſay) of the vaſt Tribute which he raiſeth annually upon the *Silver Mines* there, as becauſe they think it may little conduce to their Advantage to have this compendious Way of Navigation diſcovered: And therefore they have thought fit to *prohibit* all farther Search into the Navigation of *Jezzo*, and the Countries adjacent: upon which very Reaſon they have alſo endeavoured to conceal their *auſtral Plantations*.

Now concerning that Tract or Space which lieth betwixt *Spitzberg*, *Nova Zembla*, and the *Streights* of *Jezzo*, we have no Reaſon, for ought I ſee, to entertain any Doubt; becauſe many of the *Muſcovite* Itineraries aſſure us, that the Coaſt of *Tartary* runs not *northward* from *Nova Zembla*, but turns up very much towards the *Eaſt*; ſo that the Head-land of *Nova Zembla* is far the moſt *northern* Part of all *Tartary*. This may likewiſe be collected out of the Hiſtories and *Maps* of *China*, which affirm, that thoſe which paſs from the *Wall* of *China* northward, may, in the Space of fourteen *Days*, reach the *Sea*. And the Coaſt of *Tartary*, which lies beyond the *Samojeds*, ſufficiently teſtifieth the Neighbourhood of the Sea; foraſmuch as the farther any Man advanceth towards the *Eaſt*, the *Muſcovites* have there obſerved large and navigable Rivers, and fair Cities abounding with Plenty of all manner of Things.

It remains now that we ſhould inquire by what Courſe, and in what Seaſon of the Year, this Voyage is chiefly to be undertaken. It is hardly to be doubted, but that the *Streight* which lies betwixt *Spitzberg* and *Nova Zembla* may be paſſed; and the *Courſe* is to be directed to 78, 79, and even to the 80th *Degree* of *Northern Latitude*. If any Man ſhall, holding the ſame Courſe, proceed farther, he will find the Paſſage ſhorter: For if we draw a Line to paſs from our Seas through the 78th or 79th *Degree* of *Latitude* to the *Streight* of *Jezzo*, it will be very near a ſtrait Line; but if any would from the ſame *Degree* of *Latitude* (having paſſed *Nova Zembla*) chooſe to decline toward the Coaſt of *Tartary*, and coaſt along by it till he meet with ſome *Streight*; he would find his Courſe ſomewhat longer, but, peradventure, ſafer and better; ſince many *Streights* would ſeaſonably preſent themſelves to him, and he might ſafely neglect the Meaſure of *Longitude*, which in open Seas (and eſpecially thoſe that are near the *Pole*) is found difficult to be obſerved. Neither ought this to be any Hindrance, but that the other may be frequented: For though, in Places near the *Pole*, the Moments of *Longitude* have great Variety in a little Space; yet there ariſeth not any great Difficulty from thence, ſince the Error may more eaſily be rectified in leſſer Circles: For the Error cannot be very great which falls out in *Longitudes* ſo much contracted.

As to the *Time* of the *Year* wherein this Navigation ought to begin, it may be conſidered two Ways: In the Beginning of the Spring, *viz.* in the Month of *March*, it is confeſſed, by moſt Men, that the Winds and Seas are favourable to thoſe that ſail to *Spitzberg*, and the Places near the *Pole*; and that they may run all that Courſe from theſe Parts in 12 or 13 *Days* Space: But, when they have paſſed ſo far, if any Man would deſign to ſail to the *Streights* of *Jezzo*, he muſt ſteer his Courſe towards the *South*: But then theſe Motions of the Winds and Seas, which were favourable to thoſe who ſailed *northward*, will be contrary to thoſe who ſtand *ſouthward*; and they may long enough expect northern Gales, which ſeldom blow till towards the latter End of *Summer*; *viz.* in the Month of *Auguſt*. If, therefore, any Man would contrive to diſpatch his Voyage in the ſhorteſt Time, it were his ſafeſt Rule to make choice of that *Time* of the *Year* wherein he might ſooneſt make to *Spitzberg* to and again, which I conceive would be in the *Beginning* of *Summer*; yet it would be ſafer to ſet out ſooner, if the Wind permit. And although this Courſe ſhould happily ſucceed, it follows not that I ſhould adviſe them to obſerve the ſame in their Return homeward; for Things of that Nature muſt be left to the Prudence and Conduct of diſcreet Pilots and Mariners: Who are yet to be advertiſed, That ſince the greateſt Part of this Navigation is to be ſought through unknown Seas, they ſhun, as much as in them lieth, all near *Approach* to the Coaſts and Iſlands which they ſhall encounter, for fear of the *Ice*; and that they may always make choice of the moſt open Seas, which are leaſt infeſted with it, and in which the *Colds* are moſt *moderate*. For Experience hath ſufficiently taught, that whole large Seas are never known to be frozen, but the Borders of the Seas near Land only; and theſe, by reaſon of the Plenty of *freſh Waters* that run into the Ocean, or the *Snows* melted in it. And the ſame Experience hath taught, that there is not that Danger from the fluctuating *Ice*, as is vulgarly apprehended, eſpecially in Seas not ſubject to violent Storms, and within the ſixth, or rather the eighth Month of the *Year*.

When the Nature of this Sea, and of its ſeveral Streights, ſhall be more perfectly diſcovered, it is not to be doubted but that the whole Voyage betwixt *Us* and *Japan* may be performed in the Space of five or ſix *Weeks*, at the moſt: But in caſe it ſhould, either by Accident or groſs Error, ſo fall out, that the Ships ſhould be forced to *Winter* there before they could recover Home; this, likewiſe, might be done without much Danger, provided that they avoided the unadviſed Proceedings of the *Dutch*; who being caught, and neceſſitated to paſs the *Winter* in the moſt *Northern Climates*, planted themſelves there, upon the higheſt Lands, in Huts framed of thin Boards (whereas in *Lapland* itſelf it is impoſſible to live ſo); but they ought to ſink their Houſes under-ground, and to heap much Earth over them: Since it is not poſſible, or, at leaſt, extremely difficult, for Men to ſubſiſt in ſuch an exceſſive Severity of *Winter*, unleſs they neſt themſelves under the Earth.

Obſervations in two Voyages to the Eaſt-Indies; *by Mr.* Ric. Smithſon. *n.* 50. *p.* 1003.

XXVIII. From *England* to Cape *Finis Terræ*, in 44 *Deg. N. Lat.* the Bay of *Biſcay* is ſubject to Storms, the Sea rough, and the Waves running very high.

From thence to 34 *Degrees* the *Wind* is *variable*; but if you be within 100 *Leagues* of the *European* Continent, it is generally inclined to *North-eaſt*.

From 34 *Degrees*, if you be inclining for the Coaſt of *Africa*, or about the Meridian of the *Canaries*, the *Wind* is ſo *certain*, and conſtantly at *North-eaſt* (or within two *Points*), that it is rare to find it otherwiſe; yet in *Winter*, upon the Coaſt of *Africa*, there are ſometimes *weſterly Storms*, that are violent, but of no long Continuance: And in *Summer*, when it is ſometimes calm, the Air will come *variably*. Theſe *North-eaſt Winds* hold moſt commonly to 8 *Deg. North Lat.* and then begin the *Tornado Winds*, which are moſt part confined between 8 and 4 *Deg. North Latitude:* They are ſeldom or never more *ſoutherly*; but on this Side the *Line* they have ſometimes been met between 11 and 12 *Degrees North Lat.* Theſe *Tornadoes* are *uncertain Winds*, blowing from all *Points* of the *Compaſs* in the ſame Hour, and ſometimes the Wind *ſhifts* thus without being *intermitted*, and otherwhiles it will be ſtark calm almoſt between every Puff. They are ſo confuſed, that let four or five Ships ſail together as near as is fitting for Ships that keep Company, at the ſame Inſtant, many times, every Ship ſhall have a *ſeveral* and *contrary Wind:* And this Place is almoſt always infeſted with horrible *Thunders*, *Lightnings*, and *Rain*. And the nearer you are to the *Africk* Shore, ſo much more dreadful is the *Thunder* and *Rain*; but the farther *Weſtward* you go, the *Thunder* and *Rain* will be leſs, and the *Wind* not ſo *uncertain:* So that if you go as far *Weſt* as the Meridian of the *Eaſt Side* of *Braſil*, there is little *Thunder*, neither doth the *Wind* come down in ſuch Puffs and *Flaws*; but between 4 and 8 *Deg.* it is moſt inclined to *Calms*, and very great and thick *Fogs*, and the *Rains* come not in ſuch violent Showers.

Likewiſe this is a ſure Rule, that near the *Africk Shore*, and ſo for 100 or 200 *Leagues Weſt*, the *North-eaſt Winds* commonly incline more and more to the *Eaſt*; ſo that, by that time you come to the *Weſt* of the Meridian of the *Azores*, but twenty *Degrees*, the *Trade* or *Conſtant Wind* will be moſtly *E. N. E.*

Now as from 34 to 44 *Deg.* near the Continent of *Europe*, the *Winds* are commonly between *E.* and *N.* ſo, after you come ſo far *Weſt* as the Meridian of the hithermoſt of the *Azores*, they are commonly between *S. W.* and *N. W.* and, for this Reaſon, Ships that are outward-bound to the *Streights* keep near the Coaſt of *Portugal*, but homeward-bound they are many times forced to run far *Weſt* to fetch a *weſterly Wind*: Likewiſe, Ships bound to *Barbados* go by the *Canaries*, but come Home a great Way to the *North-weſt* of the *Azores*; and the *Virginia* Ships are twice as long in going out, as they are in coming Home, and, many times, longer: For they come Home before the *Wind* directly, but go out round about as far as the *Tropick*, or, at leaſt, 28 *Degrees Latitude*, for the Benefit of the *North-eaſt Wind*; and when that hath carried them far *Weſt*, they come back to the *Northward* again: And then, as the *weſterly Wind* hangs more or leſs *ſoutherly*, they have a good or bad Paſſage.

Between 3 and 4 *Degrees Northern Latitude*, the *South-eaſt Wind* begins to take Place between the *Æquator* and the *Tropick* of *Capricorn*; but the nearer you are to the Coaſt of *Africa* it is ſo much more *ſoutherly*; and, as you approach to the Coaſt of *Braſil*, it inclines more and more *eaſterly*. And there is not only a *Variation* in the Wind in reſpect of *Longitude*, but alſo in reſpect of *Latitude*; for near the *Æquator* the *Wind* is more *ſoutherly* than it is, in the ſame Meridian, near the *Tropick* of *Capricorn*. As for example; in the great *Bay* of *Guiney* (which our Seamen call the *Bight* of *Guiney*) the *Wind* (as I have been credibly informed) is moſtly *South*, and inclines as much to the *Weſt* as to the *Eaſt*; but in the ſame Meridian, near the *Tropick* of *Capricorn*, I am ſure it is conſtantly between *S. E. by E.* and *S. E. by S.* and, on the contrary, in that Meridian, which may be about 100 *Leagues* to the *eaſtward* of *Braſil*, near the *Æquator* the *Wind* is between *South-eaſt* and *Eaſt South-eaſt*; and in the ſame Meridian the *Winds* near the *Tropick* are more *variable*, but moſt part about *North-eaſt*. In our latter Voyage from the *Line* to the *Tropick* of *Capricorn*, we had many *Calms*, and what *Winds* we had were very ſmall, which was in the latter Half of *April*, and the former Half of *May*; but in our *firſt* Voyage, in the latter Half of *May* 1657. great *Storms*. The *ſtormy* Days were *May* 16, 17, 18. eſpecially the 17th, in 7 *Deg. Southern Lat.* alſo the 20th and 21ſt, in the *Lat.* of 12 and 13 *Deg.* and the 27th at Night in *Southern Lat.* of 22 *Deg.* which *Storm* was the moſt ſudden and unexpected that ever I ſaw: For all Day it was very fair Weather, and ſo till 8 at Night, and the *Wind* at *North-eaſt*; but, on a ſudden, came a violent *Storm* of *Wind* at *South-weſt*, and, in a Moment, the whole Heavens were become black, and prodigiouſly dark, which continu'd till Four the next Morning,

ing, with intolerable *Rain*; and then the *Wind* came again at *North-eaſt*, and it was preſently *fair*.

Near *Africa* the *South-eaſt Winds* hold to 28 or 29° *Southern Lat.* but towards *Braſil*, from the *Tropick* of *Capricorn* to 32°, they are *variable*, and to the *ſouthward* of 32° *weſterly*; as you may perceive by this following Account: *May* 29. *Lat.* 24° 27′ *Longit.* (by the *plain Sea Chart*) from the *Lizard* 11° *Weſt*; *Variation* 10° 7′ *Eaſt*: *Fair Weather*; the *Wind* from *S. W.* to *W.*

June 1. Little *Wind*, at *S. W.*

June 2. *Lat.* 26°, *Calm* all Day, and a great *Storm* all Night at *South*.

3. Strong *Wind* at *S. S. E.* At 1 at Night it came to *E. by S.* and blew with the ſame Violence till next Day Noon.

4. *Lat.* 26° 15′ *South*, *Longit.* from the *Lizard* 9° 24′ *Weſt*; the *Wind* moderate at *E. by S.*

5. *Lat.* 27° 32′. A freſh Gale at *E. by N.* dark and cloudy, but no *Rain*.

6. and 7. The ſame.

8. Dark Day, and *calm* all Day and Night.

9. *Calm* till Midnight; then a little *Wind* at *N. W.*

10. *Lat.* 32°. *Calm* all Day, and till Midnight; then a freſh Gale at *N. W.* This Day we ſaw a great Number of Whales ſporting themſelves.

11. *Lat.* 32° 43′. The firſt clear Day we had in a Fortnight. Strong *Wind* at *N. W.*

12. *Lat.* 33° 44′, *Long.* 5° *Weſt*, *Variation* 9° 40′ *Eaſt*, *Clear* Weather, till the latter End of the Night; then it *rained*: Strong *Wind* at *W. N. W.* and a ſmooth Sea; ſo that we ſailed this Day 177 Miles; the moſt that our Ship ſailed in 24 Hours in all the Time of the two Voyages, that I ſailed in her.

13. *Lat.* 34° 15′ *South*, *Longit.* 2° 7′ *Weſt*, Violent Wind. At 4 *P. M.* it ſhifted ſuddenly from *W. N. W.* to *W. by S.* at 10 at Night to *S. W. by W.* after Midnight to *S. W. by S.* about 4 to *S. S. W.*

14. Very great *Wind* at *S. S. W.* About Midnight it ſhifted to *W.* and immediately followed a very terrible *Storm* of *Wind* and *Rain*, and a great over-grown *Sea*.

15. At 7 in the Morning the Wind came back again to *S. S. W.* the whole Day was a very dreadful *Storm* of *Wind*. At Noon (by Account) we were in 34° 42′ *South Latit.* and 3° 20 to the *eaſtward* of the Meridian of the *Lizard*: The *Sea* was exceedingly rough. At 4 *P. M.* fell a great *Storm* of *Hail*: At Night was a great *Eclipſe* of the *Moon*: She began to be *totally dark* about *Half* a *Quarter* paſt 8, and began to *recover* ſome of her *Light* 2 *Minutes* before 9; as we reckoned the Time by our *Glaſs*.

16. A little before Noon the *Wind* came to *Weſt*, and continued a ſtrong Gale, but with fair Weather.

17. *Lat.* 35° *South*; *Longit.* (from the *Lizard*) 7° ½ *Eaſt*, *Variation* 2° 30 *Eaſt*, We ſaw many great Heaps of *Weeds* in the Sea, and a great rolling Sea came out of the *South*. A ſtrong *Wind* (without Guſts) all theſe 24 Hours at *W*.

18. A very ſtrong *Wind* at *Weſt*. We ſailed 170 Miles.

21. Was the firſt *clear* Day we had this Month, *Latit.* 35° 40′ *South*, *Longit.* 17° 40′ *Eaſtward* from the *Lizard*, *Variation* 1° 4′ *Weſt*. The Wind at *North-weſt* till 4 *P.M.* then it came to *Weſt* with a thick Sky, and cold *Rain*. At 8 to *W.S.W.* At 3 in the Morning to *S.W.* and at 6 to *S.S.W.* At 9 the next Day to *South*; all ſtrong *Winds*.

22. Dark and cloudy. At 2 of the Clock the *Wind* came to *S.S.E.* At 4 to *E.S.E.* At 10 to *Eaſt*, and there continued till the 24th in the Morning; which all accounted very ſtrange.

24. In the Morning, it fell *calm*, and was pretty *warm*, having been bitter *cold* the laſt 10 *Days*. At 3 o'Clock in the Night a freſh Gale at *N.N.W.*

25. *Lat.* 36° 10′, *Longit.* 21° 25′, *Variation* 3° 40′ *Weſt*, Fair Weather, *Wind N.N.W.*

26. A clear Day, *Wind N.N.W.* *Variation* 4° 30′.

27. In the Morning, *calm*; about 9 *Wind* and *Rain* out of the *S.W.* at Night *calm* and *fair*.

28. A fair Day, and moſt part *calm*. At 10 at Night, *heaving* the *Lead*, we had *Ground* 130 *Fathoms*, the *Sand* like *Calais Sand*: The *Variation* was 7° 10′. This was off Cape *Aguthas*, the moſt *Southerly* Land of all *Africa*, lying 90 *Miles E.S.E.* from the Cape of *Good Hope*.

In our *latter* Voyage, after we came to 32° *South Latitude* (to which Place from the *Line* we were much *becalmed*), we had fair Weather, and a *conſtant Wind* between *W.N.W.* and *W.S.W.* all along to the Cape (and ſo it is moſt commonly). I have therefore noted the *Weather* in the former Voyage, becauſe it was *unuſual*, in that vaſt Space between *Rio de la Plata* and the Cape, the *Wind* being all the Year *weſterly*; but about the Cape, from the End or Middle of *September* to the Beginning of *April*, the *Winds* are *variable*, as in *England*: The reſt of the Year they are *weſterly*, and intolerable *Storms*.

I can give no Account of any thing to the *Southward* of 37 *Degrees*; thoſe few Ships that have adventured to 38 *Degrees*, reporting the *Winds* and *Seas* ſo raging, that none dare go farther.

Obſervations in the Eaſt-Indies, *by Sir* Phi. Vernatti. *n.* 43. *p.* 863.

XXIX. 1. The greateſt Length of Time that *Pearl-divers*, in theſe Parts, can hold *under Water*, is about a *Quarter* of an *Hour*, and by no other Means but Cuſtom; for *Pearl-diving* laſteth not above ſix *Weeks*; and the *Divers* ſtay a great while longer *under Water* at the End of the Seaſon, than at the Beginning. Here, at *Batavia*, is an expert *Diver*, who receives Wages for nothing elſe but for *diving* for Anchors, Guns, &c. loſt in the Road. I have ſeen him ſeveral times go down, holding my Breath as long as I could, but he ſtayed 10 *Times* as long *under Water* as I could hold my Breath.

But he will not go down unleſs you give him a whole *Pint* of *Strong Water*.

2. The *Oil* drawn out of the *Roots* of *Cinamon-trees*, and reſembling *Camphire*, is thence extracted; the *Roots* being dried, bruiſed, and ſteeped in Water, and then drawn over by an *Alembick*.

3. The *Lignum Aloes* is Part of a *living* Tree, but commonly found when it is *withered*. The Tree itſelf is of a white ſoft Wood, giving a *milky* Juice, which is ſo *venomous* withal, that if, in cutting the Tree, any of the *Milk* light in your Eye, you grow blind; if on any other Part of the Body, it becomes ſcabby, and noiſomely ſore. The *Lignum Aloes*, or *Calambac*, is found within the white Wood, but not every-where. When the Tree decays, the white Wood ſoon withers, and grows Worm-eaten; and the *Milk* ſo dries up, that you may eaſily rub it aſunder with your Hand. The beſt is found in the midſt of the Tree, nouriſhed by the *Heart-root*, which goes ſtrait down into the Ground.

4. The *Wood*, *ſtinking* like *human Excrement*, grows thus naturally in the Iſles of *Solor* and *Timor*, and thereabouts.

5. There are, indeed, ſuch *Serpents* in theſe Parts, which have an *Head* on each End of their Body, called *Capra-Capella*. They are eſteemed *ſacred* by theſe People, and fortunate to thoſe in whoſe Houſes and Lands they are found; but pernicious to whoſoever doth them Harm.

Obſervations in the Eaſt-Indies, *by* … *n.* 243. *p.* 273.

XXX. It does not appear that the *Maldiva* Iſlands were ever joined to the main Land, there being no *Soundings*, as they call them, between the Iſland and the Main; and the Earth, Sand, and Shells, of the one, much differing from the other. The ſmall Shells call'd *Cowries*, which paſs for *Money* in *Bengal*, and other Places, are chiefly found there.

The *North* and *South Poles* are not viſible under the *Line*; for, in the cleareſt Night, the *Horizon* is overcaſt with a thick mighty Darkneſs, that no *Star* can be ſeen.

Gum-lack is the Houſe of a large Sort of *Ants*, which they make on the Boughs of Trees, which ſerves to keep them from the Weather, *&c.*

It is certain that *Cloves* will *attract* Water at ſome Diſtance, which is daily experienced amongſt the *Dutch* in this Country, who make a conſiderable Advantage thereby. I have known a Bag of *Cloves*, laid over Water one or two Foot diſtant, which has, in a Night's Time, *imbibed* a conſiderable Quantity of Water; and grown ſo moiſt, that the Water might be preſſed from them.

There has been an *Oyſter-ſhell* in *Bantam* that has been about 18 *Inches* Diameter, and ſeveral in *Maccao* that have been 18 *Inches* long, and 5 or 6 *broad*; whoſe *Meat* within has been proportionable to the *Shell*.

I am well informed, by the Perſons that did ſee it, that at *Batavia* a whole *Duck* was taken out of the Belly of a *Snake*; and that in *Achaia* they did kill a *Snake* that had a whole *Deer* in its Belly, which they took out, being freſh and good; and that they did dreſs and eat Part of the *Deer*.

They draw their *Wire* in Moulds of ſeveral Sizes, gradually, as we do.

The *Chineſe* gild Paper with *Leaf-gold* and *Silver*, laid on with a very good Sort of *Varniſh* they have, which is the ſame wherewith they *varniſh* their *lacker'd Wares*; all which, after it is thoroughly dry, they put in a Screw-preſs, and, with an Inſtrument like our *Plane*, ſhave it as fine as they pleaſe: And ſo they cut their *Tobacco*, which is as fine as a Hair.

Ambergris is found, more or leſs, in moſt Parts: Great Quantities are found at *Japan*, and to the eaſtward of *Java*, and at *Maldiva* Iſlands; which, they ſay, they find, generally, faſtened to the *Roots* of *Trees* that grow in the Sea near the Shore; and that, while it is kept under Water, it is ſoft and pliable like Wax, and ſometimes like Jelly. There is now a Piece in *India*, which I have ſeen, that weighs above 2000 *Ounces*.

The People of *Java* marry, and have *Children*, at nine or ten *Years* of Age; and generally leave *Child-bearing* at or before thirty. At *Tonquin* there are Women common to any that will hire them, at eight or nine *Years* of Age.

The *Japan* and *China Varniſh* is made of *Turpentine*, and a curious Sort of *Oil* they have, which they mix and boil to a convenient Conſiſtence, which never cauſes any *Swelling* in the Hands or Face, *&c.* of thoſe that make or work it. The *Swelling* that often happens to thoſe that work the *lacker'd Ware*, and ſometimes to thoſe that paſs only by the Shops and look on them at Work, is from the *Lack*, and not the *Varniſh*; which *Lack* is the *Sap* or *Juice* of a *Tree*, which runs out ſlowly by cutting the Tree, and is catched by Pots faſtened to the Tree: It is of the Colour and Subſiſtence of *Cream*; the Top, that is expoſed to the Air, immediately turns *black*, and the Way that they make it *black* and fit for Uſe is, to put a ſmall Quantity into a Bowl, and ſtir it continually with a Piece of ſmooth Iron for 24 or 30 *Hours*; which will both thicken it, and make it *black*; to which they put a Quantity of very fine Powder of any Sort of burnt Boughs, and mix it very well together, and then, with a Bruſh, lay it ſmooth on any thing they deſign to *lack*; then let it dry very well in the Sun, which will then be harder than the Board it is laid on: When it is thoroughly dry, you muſt rub it with a ſmooth Stone and Water till it is as ſmooth as Glaſs, and on that lay your *Varniſh* made of *Turpentine* and *Oil*, boiled to a due Conſiſtence, for *black Lack*; but if you would have *red*, or any other coloured *Lack*, you muſt mix your Colour, in fine Powder, with your *Varniſh*, and take care to lay your *Varniſh* on as ſmooth as poſſibly you can, for therein lies the Art of *lacking* well. If you would paint in *Gold* or *Silver*, &c. you muſt, with a fine Pencil dipped in the ſaid *Varniſh*, draw what Flowers, Birds, *&c.* you pleaſe, and let it lie till it begins to be dry; then lay on your *Leaf-gold* or *Silver*, or *Pin-duſt*, &c.

It is well known that there is, amongſt the *Bramines*, a Language called the *Sanſcreet*, writ in a different *Character* from what is now in Uſe; in which Language are written the *Porane*, or ſacred Hiſtory; the *Shaſtram* being to them what the *Bible* is to *Chriſtians*; and the *four Beads* (whereof one is loſt) containing their *Divinity*, *Law*, *Phyſick*, &c. and ſome other Books. This Language is not underſtood by all *Bramins*, but only by the Studious and Learned among them. I aſked one of the moſt eminent among them in this Place, how long it was ſince the ſaid Language was loſt. Who anſwered, That it was ſpoken in the Age of the Gods, or when they lived upon Earth; which, by their Calculation, continued many Thouſand Years, and ended ſo many Years paſt, as we reckon from the *Flood*, or thereabouts: But they have little Knowledge in *Chronology*. It is evident, that ſeveral of the Languages now ſpoken in *India* are derived from the *Sanſcreet*; and one of the *Bramines* writ a Book to ſhew that the preſent *Hindoſtan*, or Language ſpoken by the *Moors*, in particular, is derived from thence.

I have inquired of two of the moſt knowing *Bramines* in this Town, and they both agree, that our *Sunday* in every Week was a *Holy-day*, or Day of Reſt, with them; and, for fear they ſhould abuſe me, I have aſked a *Mowla*, or *Mahometan* Prieſt, a Native of *India*, and one that always lived amongſt them, and he gave me the ſame Account. Beſides this, they have their *monthly Holy-days*; for the 8th *Day* after the *Change* of the *Moon* is always a *Day* of *Devotion*, as alſo the 14th; and the 11th *Day* from the *Change* a ſtrict *Faſt*, called *Jaka Daſee*, or *Yaka Daſee*: So likewiſe the 8th *Day* from the *Full Moon*, and the 14th, are *Days* of *Devotion*, and the 11th a *Yaka Daſee*. Beſides theſe, they have, throughout the Year, ſeveral *feſtival Days* and *Times*, as in other *Religions*.

Upon the *Death* of any Perſon, the next of Kin, eſpecially a Huſband for a Wife, a Father for a Child, *& vice verſa*, as alſo a Brother for a Brother or Siſter deceaſed, do *mourn* fifteen *Days*; during which Time they eat only Rice and Water; and are not either to eat Beetle, or mark their Foreheads, but uſe ſeveral Waſhings, and Variety of other Ceremonies: As carrying Victuals to Gardens, Groves, and Tanques; to diſtribute, and make ſeveral Prayers that God would grant the deceaſed Party a good Place in the other World, forgive him his Sins, be favourable unto him, *&c.* and upon the 16th *Day* they make a *Feaſt* to all their Friends and Relations, and thoſe of their own Coaſt, as they are able; and likewiſe *yearly*, upon the *Day* of his Death, they give *Alms*, *i. e.* Victuals, to more or leſs poor People, as they are able, with whom they make Prayers for the *Dead*.

Obſervations in Japan; *by M . . . . . n. 49. p. 983.*

XXXI. 1. The *Japoneſe* doubt not at all of their Country's being an *Iſland*, though it be ſeparated from the *Continent* by ſuch narrow Chanels; that no Veſſel, of any conſiderable Burden, can paſs them.

2. The *Air* is very *ſalubrious*, but of another Temper on this, than on that Side of the *Mountains* which divide *Japan*. The *Plague* hath never been heard of there, but the *Small Pox* and *Fluxes* are very frequent.

3. Their *Mountains* are fertile almoſt to the very Top.

4. There are found almoſt all *European* Sorts of Fruit; *Peaches*, *Apricocks*, *Cherries*, *Prunes*, *Apples*, *Pears*; and, particularly, *Pippins*, *Bon Chretien Pears*. Beſides theſe, there is an Infinity of other Fruit, but almoſt none but what is found in ſome Part or other of *India*.

5. *Silver* is there in its higheſt Perfection, but not uſed in Trade, in which is ſeen nothing but *Gold*, and ſome ſmall *Coin* of *Braſs*; which latter they ſpoil by refining it too much. *Steel* alſo is there, very good.

6. The Temper of their Metals was formerly better than it is now; but yet they make *Courtelaſſes*, or ſhort Swords, exceeding good.

7. The great *Mountain* of *Japan* is higher than the *Pico* in *Teneriff*, ſince, being above eighteen *Leagues* diſtant from the Sea-ſide, it may be ſeen above forty *Leagues* off at Sea. There are eight *Vulcanos*, or *Fire-ſpitting Mountains*, in *Japan*; and you cannot go into the *Campagne*, but you diſcover one or other of them.

8. There are many *Medicinal Waters*, and *Hot Springs*, which the Inhabitants uſe in their Diſtempers. They have particular Medicines, but they *let no Blood*. They make much uſe of *Cauſticks*, by applying upon ſome *Nerve* or other the Powder of *Artemiſia*, or *Mugwort*, and *Cotton*, which they ſet on Fire. They always drink their Liquors warm.

9. There is ſo great a Store of *Veniſon* in *Japan*, that they care little for Cattle, though there be no want of them. They employ moſt *Oxen* for Ploughing, and they make no Butter, nor Cheeſe; nor are they Lovers of Milk. They have great Plenty of *Corn* and *Rice*.

10. The *Japoneſe* are proper enough of Stature, and not uncomely in *Features*; they have ſomewhat prominent Bellies; they are exceeding active, and want no Judgment: They are alſo military and valiant.

11. No *Arts* are to be met with amongſt them that are not known in *Europe*, except that of making *Lacca*; of which there is ſome ſo fine and curious, that whereas, in this Country, one may buy an ordinary ſmall Box for three or four *Crowns*; one of the ſame Size, when made in *Japan*, of exquiſite *Lacca*, will ſell for more than eighty *Crowns*. The Author of this Account hath four *Cabinets* of this Workmanſhip, which he affirms to have coſt him above Forty thouſand *Crowns*, which he will not ſell under Eighty thouſand *Crowns*.

12. The *Colours* with which they *dye* their Stuffs never fade: I have ſeen one of them, which our *Vermilion* and *Couleur de feu* come not near to. It is extracted out of a Flower like to *Saffron*, and *one Pound* of it coſts an incredible Price. To try whether the *Colour* will not change by *Lixivium*, or *Lye*, they apply an hot Iron to it; and if there it holds, they aſſure themſelves of the Durableneſs of the *Colour*.

13. They have *Mathematicians* amongſt them, and believe *Judiciary Aſtrology*; inſomuch that the Grandees undertake nothing without preconſulting thoſe that make Profeſſion of the ſame.

14. *Japan* yields divers Sorts of good merchantable Commodities, but chiefly all Sorts of *ſilken Stuffs*, *unwrought Silk*, *Amber*, *precious Stones*, *Musk*, *Copper*, *Steel*, *Lack-work*.

15. The Country is very well peopled, and exceeding rich, but exceedingly ſtored with *Gold Mines*; and I have ſeen ſome of the *Gold Ore*, which, of 10 *Ounces*, yields 8 of the higheſt *Fineneſs*, and Pieces of the Weight of 120 *Marks*.

16. Their *Buildings* are very good and commodious. The Apartments are all below on the Ground, ſeparated from one another by Partitions of *Cartoon* painted and gilt, which may be folded and removed like *Screens.* Their Floors are covered with *Mats*, and ſometimes with *ſilken Stuff*, embroidered *Velvet*, and *Cloth* of *Gold.*

17. They have no other Conveniencies to defend themſelves from *Heat* and *Cold*, but ſuch as are uſual in *Italy* and *Spain.*

18. They uſe the *Divertiſements* of *Comedies*, which are more brave than thoſe of *Europe.* The Spectators are about 200 Paces diſtant from the *Theatre*, which, being covered with a *Vault*, makes the Voices of the Actors to be underſtood to the very End of the *Theatre.* They *love Hunting* and *Gaming*, as *Dice*, *Cards*, *Cheſs*, &c. At all Times of the Day, and in all their Viſits, they take *Tea* and *Tobacco.*

19. Their *Language* is altogether different from the *Chineſe*, but their Prieſts and Courtiſans, that is, the Learned amongſt them, which bear the Offices of the Court, underſtand the Tongue of *Cochin China*, and, by this means, that of *Tunquin*, *China*, *Corea*, &c. They write neither from the Right to the Left, nor from the Left to the Right, but *downward.*

20. Their Government is *deſpotick*; the Religion *Pagan*; the *Chriſtians* hated upon no other Account, but that ſome of thoſe that there profeſſed it, would perſuade the *Japoneſe* to acknowledge a Superiority above the Dignity *Royal*, diſpoſing of Crowns and Sceptres. Their *Morals* are very good, their *Faults* being puniſhed as their *Crimes*; even *Lying* and *Detraction.* Their *Left Hand* is the more honourable, and they take Horſe on that Side.

Obſervations in Hollandia Nova, *by Mr.* Witſen. *n.* 245. *p.* 361.

XXXII. In a late Voyage to the *South Land*, called *Hollandia Nova*, it hath been diſcovered, that the *Soil* of the Country is very barren, and as a Deſert. No *Freſh-water Rivers* have been found, but ſome *Salt-water Rivers*; as alſo no *Four-footed Beaſts*, except one as great as a *Dog*, with long Ears, living in the *Water*, as well as on the *Land.*

Black Swans, *Parrots*, and many *Sea-cows*, were found there; as alſo a *Lake*, whoſe Water ſeemed to be *red*, becauſe of the *Redneſs* of the Bottom of it; and round along the Shore there was ſome *Salt.* Our People ſaw but twelve of the *Natives*, all as *black* as Pitch, and *ſtark naked*; ſo terrified, that it was impoſſible to bring them to Converſation, or a Meeting. They lodge themſelves, as the *Hottentots*, in Pavilions of ſmall Branches of Trees. By Night our People ſaw *Fires* all over the Country, but when they drew near, the *Natives* were fled. The Coaſt is very low, but the Country far from the Sea is high.

Upon the *Iſland*, near the Coaſt, were ſeen *Rats* as great as *Cats*, in an innumerable Quantity; all which had a kind of Bag or Purſe hanging from the Throat upon the Breaſt downwards. There were found many *well-ſmelling* Trees, and out of their Wood is to be drawn *Oil* ſmelling as a *Roſe*; but for the reſt, they are ſmall and miſerable Trees. There were alſo found ſome *Birds Neſts* of a prodigious Greatneſs; ſo that ſix Men could not, by ſtretching out their Arms, incompaſs one of them; but the *Fowls* were not to be found.

There were great Store of *Oyſters*, *Lobſters*, and *Crabs*; as alſo of ſtrange Sorts of *Fiſh*.

There were alſo Millions of *Flies*, very much troubling Men. They ſaw a great many Footſteps of Men and Children, but all of an *ordinary Bigneſs*. The Coaſt is very foul, and full of Rocks.

XXXIII. In *Braſil* there are certain little Animals called *Poux de Pharaon*, which enter into the Feet betwixt the Skin and the Fleſh. They grow, in one Day, as big as *Beans*; and, if they are not preſently drawn out, they make an unſupportable Ulcer, and all the Foot corrupts.

Obſervations in Braſil, *and in* Congo; *by* Mich. Angelo de Guattini *and* Dionyſius *of* Placenza. *n.* 139. *p.* 977.

In the Kingdom of *Congo* there are Serpents 25 *Foot* long, which will ſwallow at once a whole *Sheep*. The Manner of taking them is thus: When they lie, to digeſt what they have eaten, they ſtretch themſelves forth in the Sun, which the *Blacks* ſeeing, kill them; and, having cut off their Heads and Tails, and imbowell'd them, they eat them, and ordinarily find them as fat as Hogs.

There are here a great Number of *Ants*, and of that Bigneſs, that the Author, being one Day ſick in his Bed, was forced to order himſelf to be carried out of his Room, for fear of being devoured by them, as it often happens to thoſe of *Angola*; where you may alſo find, in the Morning, the Skeletons of *Cows*, devoured by theſe *Ants* in one Night.

Amongſt other fair *Fruit-trees* in *Braſil*, there is one, whoſe Fruit is called *Niceſſo*; which hath this remarkable, that it hath but *two Leaves*, whereof each is able to cover a Man.

XXXIV. *Oct.* 3. 1687. The King of *Feton*, *Aben Penin Aſhrive*, died here at Cape *Corſe*, where he had been long ſick. The *Fetiſhers* had done all they could to ſave his Life, which was nothing at all to Purpoſe: Their *Phyſick* ſcarce extends to any thing but the *Flux*, and what we call the *French Diſeaſe*; his was a *Conſumption* and an *Aſthma*, of a great Continuance. So they fled to the Aid of their *Religion*, and according (it ſeems) to the Rules of that, they made ſeveral *Pellets* of *Clay*, which they ſet in his Room, in Rank and File, all *ſprinkled* with *Blood*, beſides the ſeveral Muttons which they eat to his good Health: But that was of too little Force. So the Man died, having delivered his Sword to the *Dey*, who, in the *Interregnum*, was to be the principal Man (for the Kingdom is *elective*), and commanded him to be conſtant to the *Engliſh*, of whom himſelf had been a great Favourer; with a Threat, if he was not, of haunting him after his Death: He alſo appointed one of his *Wives*, whom he thought worthy of that unlucky Honour, to accompany him to the other World. The next Day he was carried to *Feton*, and buried there, *Nov.* 2. with the poor Woman we ſpoke of; preſently after, they that were conſiderable, or had a Mind to ſeem ſo, ſent in them that they had a Mind to murder, in Honour of the King: How many there were, it is hard to ſay; the higheſt

Obſervations at Cape Corſe, *by Mr.* J. Hillier. *n.* 232. *p.* 687.

Account gives 90, the loweſt 50, the middle 70. The *Blacks* do not underſtand *Arithmetick*; ſo the Numbers they give, in all Caſes, are very uncertain. I think there were about eight from this Town, which will not hold Proportion to the higheſt Rate; but it is like near *Feton* there might be more: They ſay alſo, that many more will follow at *Half* a *Year*'s Diſtance from his Death. The Manner of the Execution of theſe poor Creatures I have not yet learnt; only, that they make them drink and dance, with a great deal of Bravery, all the Beginning of the Day, and towards Night cut off their Heads: But whether, by that, they mean the common Way of their *Executions*, I am yet to ſeek.

After the *King's Funeral*, the next Thing was, to chooſe a *Succeſſor*: So the People were called together at *Feton* (I ſuppoſe by the Authority of the *Dey*), without inquiring any thing of their *Freehold*: They pitched upon Mr. *Dey*, though he was not of the *Blood Royal*; the Reaſon was, as they ſaid, becauſe he had *Power* enough to do what he pleaſed, and they could do nothing againſt him: But he refuſed the Honour, becauſe of the Charge it would put him to; and propoſed the *Brother* of the *deceaſed King*. So the Buſineſs ſtuck ſome time; but at laſt it was accorded, and King *Aſbrive*'s *Brother* declared King, *Nov.* 18. His Name is *Abenaco*.

The Manner of their ordinary *Executions* is thus: The Creature that is condemned is made to drink abundance of *Palm Wine*, and to dance, every body that will, in the mean time ſtriking or puſhing him; when that is over, as is ſaid, he is thrown down, his Face into the Sand, which whether it ſtifle him, or not, I cannot tell; then his *Legs* are cut off below the Knees, and his *Arms* below the Elbow; afterwards his *Thighs*, and his *Arms* below the Shoulder; laſtly, his *Head*.

When any one has new *Drums* or *Trumpets*, it is neceſſary that they be conſecrated with *human Blood*: I have known but one happen of this kind, which was *Jan.* 7. 1686-7. when, after a Man had been *executed*, after the former Rate, about *Eight* in the Morning, at *One* in the Afternoon they drank *Palm Wine* out of the upper Part of his *Skull*, and this in the Sight of all the *Factors* at Cape *Corſe*.

The *Shore* lies almoſt *Eaſt* and *Weſt*, expoſed to the Sea wholly upon the *South*; the Country is *hilly*, the Hills not very high, but thick, cluſtering together, the Vallies between extremely narrow; the Whole, in a Manner, covered with certain *Shrubs*, low, but very thick. What the People *Till*, comes not to above a tenth Part of their Ground; and where they do *Till*, it hinders not that within *Half* a *Year* the Ground is overgrown as before; for they do not root up the *Shrubs*, but only cut, and ſometimes burn them ſomewhat cloſe to the Earth: So they ſpring again, in a very little Time. This is ſufficient for planting their Corn, which they do by making little Holes in the Earth at a competent Diſtance, and putting Seeds into them.

It may be, that, if thoſe *Shrubs* were deſtroyed, the *Unhealthineſs* of the *Place* might be mended; which yet is not to be hoped for but by bringing the People to ſome kind of *Induſtry*; and that will not be eaſy, they are ſo wholly given to Lazineſs, and ſo intirely bred up in it, that there muſt be the greateſt Change imaginable, before they become any whit tolerable. A Man may ſee their Temper by this, that though their *Tillage* be very eaſy, and the Earth yields many Hundreds for One; yet ſo little is the Uſe they make of it, that one ſcarce Year brings them to Danger of ſtarving: And though there be People enough, and every Man has Power of chooſing what he will, that is not already *tilled* by ſome other; yet not the *tenth* Part, as we have ſaid, is employed: So that a Man would wonder what came in the *Frenchman*'s Head to fanſy them induſtrious. But *ſubtle* they are, and diligent to *cheat* any Man that is not cautious enough to avoid it.

So that the *Fault* of the *Wood* is (by the Lazineſs of the People) without any Remedy. But there may be ſomething in the *Earth* itſelf; the Water which they have here in *Pits* (Rain-water for the moſt part, but yet ſtrained through the *Earth*) has a kind of Taſte mixed of *ſweet* and *ſubacid*, if I underſtand what I ſay: I am told it is of *Vitriol*; whether that be miſchievous, you know better than I do; but I take this for certain, ſince I have had it from good Hands, that at *Widdah*, which is one of the moſt *unhealthy Places* in *Guiney*, but it is not upon the *Gold Coaſt*, he that opens the *Ground*, though it be but to dig a Grave, runs the Hazard of his Life; ſo miſchievous are the *Steams* from thence ariſing. It is poſſible there may be ſome ſuch *Steams* here, only not ſo violent; though in *England*, I think a *Gravel* or a *Sand* (which here are always uppermoſt, for as much as I have ſeen) are eſteemed very wholſome *Soils*; under them is a kind of *whitiſh Marle* almoſt like *Fullers Earth*.

The *Age* of the *Inhabitants* is very uncertain, becauſe none of them keep an Account of it; there are ſome of them very *grey*: But if the Country be to them *unhealthy*, *grey Hairs* may come early. I think there be many more *Funerals* here than at *Oxford*, though that be a much larger Place, eſpecially in the *Rain* Times, which to us are always *healthful*.

I think that much of the *Mortality* (not all) that happens among *Strangers*, is the Effect of their ill Diet, and ill Government of themſelves: For they eat but little, having neither Stomach, nor Money to buy what they want; but they drink exceſſively, being, for that, more readily truſted, and of Liquors very hot and ſpirituous; and if any chooſe the *cold* rather, his Stomach is chilled, and he is in Danger of a *Flux*, or an *extreme Looſeneſs*, and that immediately.

There is another Thing; Men guard themſelves leſs from the *Air* than in any other Places, truſting to the *Heat* of the *Climate*, and receive the *Cool* of the Evening with only a Shirt. Now I think, that the *Air*, though not ſo *cold*, is much more *ſubtil* and *piercing* here, than in *England*. It corrodes Iron much more, not by the *Moiſture*, for it is not ſo *moiſt*; and, beſides, it does it in the *dry Weather* too. The laſt Year, from *Nov.* 1686. to *Nov.* 1687. has had the moſt *Rain* of any that can be here remembered; yet the *Mortality* was much leſs than the Years before: So that perhaps *Wet* is not that which makes the Country *unhealthy*; though

Vid. ſup. *Vol.* I. *Chap.* I.

we had very many *ſick*, eſpecially in *June* and *July*, whoſe Diſeaſes were not *mortal*.

Obſervations in Weſt Barbary, *from Cape* Spartel *to Cape* De Geer; *by Mr.* Jezreel Jones. *n.* 254. *p.* 248.

XXXV. The *Mauritanian*, or *Barbarian Moor*, when he riſes in the Morning, waſhes himſelf all over, and dreſſes; then goes to their *Jiama*, or Church, ſays his *Prayers*, and returns Home, where his Wife, Concubine, or Slave, hath his Breakfaſt provided for him; which is ſometimes made of *Barley* or *Wheat-gruel*, for I have known both. It is made ſomething thicker than ours, till it be ropy; they put *Origan*, and other Herbs, powdered, into it, which, for ſuch Uſes, they keep dried all the Year: Some will put in a little *Pepper*, and other *Spice*. I have often been treated with *warm Bread*, *freſh Butter*, and *Honey*, in a Morning, which is not ſeldom uſed amongſt themſelves an Hour or two after they have had *Gruel*; as alſo *Haſty-pudding*, with *Butter*, and ſometimes *Butter* and *Honey*: Some, again, give *Cuſcuſoo* with Milk, others with *Fleſh*, a third with *Roots*. When any one hath a Gueſt or Gueſts in his Houſe, the Neighbours bring their Diſh to welcome him or them, on account of the Reſpect and Love they bear to their Neighbour, as well as to ſhew their Readineſs to entertain the *Stranger*. This Practice is found conſtantly uſed throughout the whole Country amongſt the *Moors*, one towards another, reciprocally; and I have as often found the like Civility, as I had Occaſion to take up my Lodging at any Place where I was acquainted with any of the Inhabitants. The *Jews* likewiſe ſhew great Civility to any *Chriſtian*, and treat him with what they have; as *ſtewed* or *baked Hens*, *Capons*, *hard Eggs* boiled or roaſted (which they preſs flat with *Pepper* and *Salt*), *Wine*, *Brandy*, &c. They have generally the beſt *Bread*, and every thing elſe of the Kind, that they can get: They put *Annis*, and two or three other Sorts of *Seeds*, in their *Bread*; one is black and angled, taſtes almoſt like *Carrot-ſeeds*, and, I think, I have ſeen theſe ſometimes uſed in *Bread* in *Spain*. They eſteem *Honey* as a wholſome *Breakfaſt*, and the moſt delicious that which is in the *Comb*, with the *young Bees* in it, before they come out of their *Caſes*, whilſt they ſtill look Milk-white, and reſemble (being taken out) *Gentles*, ſuch as *Fiſhers* uſe: Theſe I have often eat of, but they ſeemed inſipid to my Palate; and ſometimes I have found they gave me the *Heart-burn*.

In *Suſe* I had a Bag of *Honey* brought by a Friend, who made a Preſent of it, as being of great Eſteem: This he told me, I was to eat a little of it every Morning, to the Quantity of a Walnut. It was as thick as *Venice Treacle*, and full of ſmall *Seeds*. It always made me *ſleepy*, but I found myſelf well, and in very good Temper of Body, after it. The *Seeds* were about the Bigneſs of *Muſtard*; and, according to the Deſcription of them to me, and the Effects I found by eating the *Honey* and them, they muſt be a large Sort of *Poppy-ſeed*. The *Honey* was of that Sort they call, in *Suſe*, *Izucanee*, or *Origanum*, which the *Bees* feed on; and theſe *Seeds* were mixed with.

Cuſcus, or *Cuſkſoo*, is the principal Diſh among them, as the *Olla* is in *Spain*. This is made of *Flour* of *Wheat*, and, when that is ſcarce, of *Barley*, *Millet*, *Indian Corn*, &c. They ſhake ſome *Flour* into an earthen Pan, made on purpoſe, which is not *glazed*, ſprinkling a little Water on the Bottom of the Pan firſt, then working it with both their open Hands flat, turning them backwards and forwards to grain it, till they make it much reſembling *Sago* which comes from the *Eaſt-Indies*. They *ſtew* their *Fleſh*, keeping their Pots cloſe covered, which are made of Earth, put the *Cuſkſoo* into an earthen *Cullender*, which they call *Caſkaſs*, and this *Cullender* into the Mouth of the Pot, that ſo all the *Steam* which riſes from the Meat may be imbibed by the *Cuſkſoo*, which cauſes it to ſwell, and makes it fit to be eaten. When it is enough, they put this *Cuſkſoo* out into a Diſh; and the *Cuſkſoo* being heaped up, they make (as it were) a Bed, or Place for the Meat to lie in; then they put good Store of *Spice*, as *Ginger*, *Pepper*, *Saffron*, &c. This *Diſh* is ſet upon a Mat on the Ground, and four Men may eaſily ſit about it; though I have ſeen ſix, and more, at one Diſh: They ſit with their Buttocks upon the Calves of their Legs, with the Bottoms of their Feet on the Ground. If there are many to eat of this Meal, there are more *Diſhes*. This *Diſh* they have in Uſe ſometimes at *Breakfaſt*, as well as *Dinner* and *Supper*, but it is commonly uſed for the two laſt Meals.

At a ſtately Entertainment they will have a Sheep roaſted whole, ſometimes a Half, or a Quarter, on a *wooden Spit*, or the moſt convenient Thing they can find. They do not continually keep turning it, as we do, but leiſurely let one Side be almoſt roaſted before they turn the other. The Fire is commonly of *Wood* burnt to clear Coal, and made ſo that the Heat aſcends to the Meat. They baſte it with *Oil*, and a little *Salt* and *Water* incorporated. They let it be thoroughly roaſted, then they ſay *Biſmillah, In the Name of God*; after they have waſhed their *Right Hands*, and pulled the Meat in Pieces, they fall to eating. It is to be noted, that they never uſe but their Right Hand in eating, and one holds, while the other pulls it aſunder, diſtributing the Pieces to the reſt, as he pulls them off. They ſeldom uſe a *Knife*, and a *Fork* is a ſtrange Thing amongſt them. They are dextrous at this Way of *Carving*, and never flinch at the Heat or Warmth; for that would look mean, and might occaſion one more bold to take his Office upon him to perform. When they have done, they lick their Fingers, and, as often as they have a hot Diſh, they waſh their Hands afreſh: Then they have *Alſdouſh*, or *Virmezzelli*, with ſome Meat on it, ſtewed Meat, well ſpiced, with ſavoury Broth; and, after they have eat the Meat, they dip their Bread in the Sauce, or Broth, and eat it. They are cleanly in their Cookery; and if a Hair be found, it is a capital Crime, but a Fly not, becauſe it has Wings, and may get in after it paſſes from the Cook's Charge or Management.

Cubbob is ſmall Pieces of Mutton, with the Cawl of a Sheep wrapped on them: Some make good *Cubbob* of the Liver, Lights, and Heart. They *pepper* and *ſalt* them, and put *ſweet Herbs* and *Saffron* into them, then roaſt them; and, when they diſh them up, ſqueeze an Orange or two on them.

Elmoroſia is another: This is Pieces of Beef, of *Cow*, or *Camel*, ſtewed with Butter, Honey, and Water; ſome will put *Rob* of *Wine* amongſt it:

they add Saffron, Garlick, or Onions, a little Salt, and, when it is enough, ſerve it up. They eſteem this a delicious Diſh, uſed moſtly in the Winter, and ſay it is good againſt Colds, notwithſtanding they ſay Beef is cooler than Mutton: Then they will treat you with Hare ſtewed, ſtewed and roaſted Hens and Partridges; theſe they disjoint, and let ſtew in Water and Oil, or Butter, if they are not fat enough of themſelves. When they are almoſt enough, they beat a Couple of Eggs, mix them with the Liquor, with Juice of Lemon, or Vinegar, which they uſually have very good, and ſerve it up.

Then you may have more baked and roaſt, and another Diſh of ſtewed Meat, which, for its Goodneſs, would be eſteemed amongſt us: They take a Leg of Mutton, cut off the fleſhy Part, leave out the Skin and the Sinews; this Fleſh they mince very fine; they alſo mince ſome Suet, Parſley, Thyme, Mint, *&c.* then they take Pepper, Salt, and Saffron, beaten together, and ſome Nutmeg, and theſe they add to the reſt, with about Half a Handful of Rice: They cut an Onion, of the beſt Sort, Half through, and take off the firſt Lay, as not ſo fit for Uſe, unleſs it be thick (they that are curious take out the inner Skin, ſaying, it is not wholſome, and bad for the Eyes, it being the worſt thing in an Onion, which otherwiſe would be the beſt of Roots); this Lay they fill with Forc'd-meat, then the next, and ſo on, which makes them look like ſo many Onions; ſome they put up in Vine-leaves, of the beſt they can find for their Purpoſe: Whilſt this is doing, the Bones, and Reſidue of the Leg of Mutton, being in moderate Pieces, are ſtewing, with as much Water as will juſt cover them; then they put on their Forc'd-meat Balls a-top of the Meat, and a green Bunch of Grapes upon them, cover it, and let it boil till thoroughly enough: This, I think, is one of their beſt Diſhes, which they often uſe in *Feſs*, and other Cities.

Pillowe, or *Pilôe*, is a Diſh very well known, made with Rice boiled, with a good Hen, Mutton, and Spice, the Fleſh and Fowl being put on the Rice in a Diſh, as *Cuſkſoo*, and ſo ſerved up.

A *Buſtard*, which they roaſt and ſtew, and make an excellent Diſh of its *Guts* (I eat of it once), to me ſeemed very pleaſant and ſavoury, and very grateful to the Stomach. This Bird is fit for their King's Table, as likewiſe the *Hedgehog*. Then they have *Ragous*, made with *Sparrows*, *Pigeons*, &c.

Their *Drink* is plain Water or Milk, and ſometimes *Rob* of *Wine* mixed with Water. I was once treated with this by the Baſhaw of *Suſe*, *Abdomeleck Ben Alchotib*, and there was brought to me a great Bowl which held above 3 *Quarts*; he told me, there was not above Half a Pint of this *Rob* in it, and the reſt was filled with Water. It was very generous and pleaſant; and though I did not drink a Quarter of it, yet I found the Strength in *Half an Hour*. This, they ſay, is a Remedy againſt *Cold* likewiſe, and pretend to take it *medicinally*; though *Rob* of *Grapes* is lawful, according to *their Law*. Under this Pretext, many *Feſſée* Merchants, to make *Rob* or *Vinegar*, preſs all the *Grapes* in their Vineyards, put it up in Jars under-ground, and keep it long; ſo that it proves excellent *Wine*. When four or five merry Companions, with every one his Miſtreſs, appoint to be merry, they go out to their Vineyard or Garden, have Muſick, and all, or moſt of thoſe Diſhes, and there ſit and carouze over a great earthen Bowl full of *Wine*, of about four or five *Gallons*, and ſo drink round in a Cup that will hold almoſt a *Pint*, like a large *Tea-diſh*, till there is none left: It often happens, that they do not part till they have made an End of the whole Jar, which ſeldom is leſs than a *Week*'s Time; I have known ſome that have been nine *Days*, ſucceſſively, *drunk*. Thoſe that are known to *drink Wine*, or *piſs ſtanding*, their *Teſtimony* will not be valid in Law. In a Morning, during this Time of Merriment, they are for ſome ſavoury Bit, *pickled Fiſh*, or *Eſchavecbe*, or *Elcbolle*. They are great Lovers of *Fiſh*, and have great Variety, and very good, which they fry in *Origan Oil*, ſtew, roaſt, and bake, with good Store of Spice, Onions, Garlick, Cumin, Parſley, and Coriander. The *Eſchavecbe*, or *fried Fiſh*, is cut in thin Slices, and put into Vinegar, with the aforeſaid Spices, adding Saffron and Pepper, *&c*. It will keep above a Month; and this they have commonly; as alſo *pickled Limes*, *Olives*, *Capers*, &c. They eat parched *Garavancas*, parched *Almonds*, and *Beans*, which they parch in a Pan with Water and Salt; theſe, and other Things, they have to reliſh their Glaſs of *Wine*, or give them a freſh Appetite to *drink*.

The *Hedgehog* is a princely Diſh amongſt them; and, before they kill him, they rub his Back againſt the Ground, by holding his Feet betwixt two, as Men do a Saw that ſaws Stones, till it has done ſqueaking; then they cut its Throat, and, with a Knife, cut off all its Spines, and ſinge it: They take out its Guts, ſtuff the Body with ſome Rice, Sweet-herbs, *Garavancas*, Spice, and Onions; they put ſome Butter and *Garavancas* into the Water they ſtew it in, and let it ſtew in a little Pot, cloſe ſtopped, till it be enough, and it proves an excellent Diſh. The *Moors* do not care to kill *Lamb*, *Veal* nor *Kid*; ſaying, it is a Pity to part the *Suckling* from its *Dam*.

They eat with their boiled Meat, many times, Carrots, Turneps of two or three Sorts, Cabbage, Beans and Peas, *&c*. of which they have Plenty, and very good. I have eat of *Porcupine* ſtewed, which much reſembled *Camel's Fleſh* in Taſte, and that is the neareſt to *Beef* of any thing I know.

I come now to give an Account of the *Alcbollea*: It is made of Beef, Mutton, or *Camel's* Fleſh, but chiefly Beef, which they cut all in long Slices, ſalt it well, and let it lie twenty-four Hours in the Pickle; then they remove it out of thoſe Tubs, or Jars, into others with Water; and when it has lain a Night, they take it out, and put it on Ropes in the Sun and Air to dry; when it is thoroughly dried, and hard, they cut it into Pieces of two or three *Inches* long, and throw it into a Pan, or Caldron, which is ready, with boiling Oil and Suet, ſufficient to hold it, where it boils till it be very clear and red, if one cuts it; which taken out, they ſet to drain: When all is thus done, it ſtands till cool, and Jars are prepared to put it up in, pouring the Liquor they fried it in upon it; as ſoon as it is thoroughly

roughly cold, they ſtop it up cloſe. It will keep two Years. It will be hard, and the hardeſt they look on to be beſt done. This they diſh up cold, ſometimes fried with Eggs and Garlick; ſometimes ſtewed, and Limons ſqueezed on it. It is very good any way, either hot or cold.

Before I conclude, I willingly give an Account of their *Travelling Proviſion*, *viz.* Bread, Almonds, Raiſins, Figs, hard Eggs, cold Fowls, *&c.* but what is moſt uſed by Travellers is, *Zumeet*, *Tumeet*, or Flour of parched Barley for *Limereece:* Theſe are not *Arabian*, but *Shicha* Names; ſo I believe it is of a longer ſtanding than the *Mahometans* in that Part of *Africk.* They are all three made of parched *Barley-flour*, which they carry in a leathern Satchel. *Zumeet* is the Flour mixed with *Honey*, *Butter*, and *Spice*; *Tumeet* is the ſame Flour done up with *Origan Oil*; and *Limereece* is only mix'd with *Water*, and ſo drank. This quenches Thirſt much better than *Water* alone, ſatisfies an hungry Appetite, cools and refreſhes tired and wearied Spirits, overcoming thoſe ill Effects a hot Sun, and a fatiguing Journey, might occaſion. This, amongſt the Mountaineers of *Suſe*, is uſed for their Diet, as well at Home, as on their Journey.

All Things taken in Game, as *Hawking*, *Hunting*, and *Fowling*, are *lawful* for them to *eat*, if they take it before it be dead, ſo that they can have time to cut its Throat, and ſay *Biſmiillah*; or if he is known to be an expert Man at the Game, and ſays theſe Words before he lets the *Hawk* take its *Flight*, lets *ſlip* the *Grey-hound*, or *fires* his *Gun*, it is *lawful*; all (I ſay, but *Swine's Fleſh*, and what *dies of itſelf*) they have Liberty to *eat*, and may ſell it. They tell us, there is but one Part about the *Hog* or *Swine* that is *unlawful*, which they do not know, and are obliged to *abſtain* from the Whole: But if they knew it, they would let us have but little to our Share. They eat *Snails* boiled with Salt, and praiſe their Wholſomeneſs. *Fiſh*, of all Sorts, are *lawful.* In *Taffilet* and *Dra* moſt of their Food is *Dates*; there are ten or a Dozen Sorts.

They have good *Capons* all the Country over; no *Turkeys*, *Ducks*, nor Geeſe, but *Wild*; and thoſe they have of two Sorts; *Ducks*, *Teal* and *Mallard*, *Corlews*, *Plovers*, *Snipes*, *Oxbirds*, *Pipers*, a Sort of *Black Crow* with a *bald Pate*, and long crooked Bill, is good Meat; and an Hundred other Sorts of *Fowls*. I have eat *Antilope*, which we have killed in *Hunting*, and are very good Food: They are as large as a *Goat*, of a *Cheſnut* Colour, and White under the Belly; their Horns are almoſt quite ſtrait from their Head upwards, tapering gradually, with Rings at a Diſtance from one another, till within an *Inch* and an *Half* of the Top; fine large black Eyes, long and ſlender Neck, Feet, Legs, and Body, ſhaped ſomewhat like a *Deer*; they have two Cavities between their Legs, I think, the Male, as well as the Female: There are many in a *Herd*, when, at the ſame time, they have *Scouts*, or thoſe who by running, give them Notice of an approaching Foe. When two lie down together, they lay themſelves ſo, that their Backs are towards each other, and the Head of one towards the Tail of the other, that they may ſee every way. Their *Young* is ſweet and pleaſant enough. They are taken ſometimes by the *Hawk*, ſometimes by the *Shot*; for they are too *ſwift* for a *Greyhound.*

Partridges in *Suſe* commonly rooſt on *Trees*, there are ſo many *Foxes*, which would otherwiſe deſtroy them.

The *Moors* will eat *Fox*, if it be fat, either ſtewed or roaſted, but they do not care for it lean; which has occaſioned a Proverb amongſt them on that Account; to wit, *Hellel deeb*, *Harom deeb*; alluding to the Scruple might be made of its *Lawfulneſs*. Thoſe Words ſignify, *A Fox is lawful, and a Fox is unlawful*; i. e. Fat, *lawful*; Lean, *unlawful*.

Fruits and *Sweetmeats* they have, of many Kinds; as of three or four Sorts of *Pumpkins*, *Macaroons*, *Almonds* prepared many ways, *Raiſins*, *Dates*, *Figs* dry and green, excellent *Melons* of two or three Sorts, and *Water-Melons*; *Pomegranates* of ſeveral Kinds, *Apples*, *Pears*, *Apricocks*, *Peaches*, *Mulberries* white and black, *Plumbs* and *Damaſcus-Cherries*, *Grapes* of many Kinds, and very good. I have known *Grapes* in *Meſſia* (*Lat.* 30 *Deg.* or thereabouts) as big as a *Pigeon's Egg* (but they do not make *Wine*); and if they would aſſiſt Nature, they might have every thing in Perfection.

Their *Salating* is *Lettuce*, *Endive*, *Carduus*, *Parſley*, *Apium*, and other *Sweet-Herbs*; *Onions*, *Cucumbers* of ſeveral Kinds, ſome about a *Yard* in Length, and two or three *Inches* thick, and hairy (this is eſteemed the wholſomeſt); *Radiſhes*, *Fumates*, or *Apples of Love*; all which they cut, and put Oil, Vinegar, and Salt, with ſome Red Pepper: This *Salad* they eat with Bread.

They have a Fruit called *Baranêên*, in *Spain Baragenas*; theſe they ſtew with their Victuals, and ſometimes cut them in thin Slices, and fry them: It makes a pretty Diſh.

When the *Moors* have feaſted, every one waſhes his Hands and Mouth, thanks God, and bleſſes the Hoſts and Entertainers from whom they had it. They talk a little, and tell ſome Story; and then lie down to reſt.

XXXVI. Papers, *of leſs general Uſe*, omitted.

1. General Heads for a *Natural Hiſtory of a Country*, great or ſmall; by Mr. *Rob. Boyle*. *n.* 11. *p.* 186.

2. Directions for Obſervations and Experiments to be made by Maſters of Ships, Pilots, and other fit Perſons, in their *Sea-Voyages*; by Mr. *Rook*: Enlarged by Sir *Rob. Murray* and Dr. *Rob. Hook*. *n.* 8. *p.* 140. *n.* 24. *p.* 432.

3. Inquiries and Directions for the *Ant-Iſles*, or *Caribee* Iſlands; by .... *n.* 33. *p.* 634.

4. Inquiries for *Virginia* and the *Bermudas*; by ..... *n.* 23. *p.* 420.

5. A Catalogue of ſeveral *Curioſities* found in *Virginia*; by Mr. *Jo. Baniſter*; and mentioned in ſome of his Letters to Dr. *Liſter*. *n.* 198. *p.* 667.

6. Inquiries for *Hungary* and *Tranſylvania*; by ..... *n.* 25. *p.* 467.

7. Directions and Inquiries concerning the *Mines*, *Minerals*, *Baths*, &c. of *Hungary*, *Tranſylvania*, *Auſtria*, and other Countries neighbouring to thoſe; by ..... *n.* 58. *p.* 1189.

8. Inquiries for *Turky*; by Mr. *H.* *n.* 20. *p.* 360.

9. Promiſcuous Inquiries ſent to *Dantzick*; by ..... *n.* 19 *p.* 344.

10. Inquiries for *Greenland*; by ..... *n.* 29. *p.* 554.

11. In-

n. 23. p. 420. 11. Inquiries for *Perſia*; by . . . . .

n. 23. p. 415. 12. Inquiries for *Suratte*, and other Parts of the *Eaſt-Indies*; by . . . . .

n. 180. p. 39. 13. A Voyage of the Emperor of *China* into the *Eaſtern Tartary*, *An.* 1682.

Ib. p. 52. A Voyage of the Emperor of *China* into the *Weſtern Tartary*, *An.* 1683.

Ib. p. 62. An Explication, neceſſary to juſtify the *Geography* ſuppoſed in theſe *Letters*; by . . . . .

n. 25. p. 470. 14. Inquiries for *Egypt*; by *Tho. Henſhaw*, Eſq;

n. 25. p. 472. 15. Inquiries for *Guiney*; by *Abraham Hill*, Eſq;

n. 23. p. 422. 16. Inquiries for *Guaiana* and *Braſil*; by . . . . .

XXXVII. Accounts of *Books* omitted.

n. 127. p. 671. 1. T*H. Bartholinus* de *Peregrinatione* Medica, &c. *Haffniæ*, 1674. in *Fol.*

n. 81. p. 4030. 2. *Caroli Claromontii*, M. D. &c. de Aëre, Solo & Aquis *Angliæ*; deque Morbis *Anglorum* Vernaculis Diſſertatio: Nec non Obſervationes Medicæ *Cambro-Britannicæ*. *Lond.* 1672. in 12*mo.*

n. 135. p. 875. 3. The Natural Hiſtory of *Oxfordſhire*, being an Eſſay toward the Natural Hiſtory of *England*; by *Rob. Plott*, LL. D. *Oxford*, 1677. in *Fol.*

n. 184. p. 207. 4. The Natural Hiſtory of *Staffordſhire*; by *Rob. Plott*, LL. D.

n. 165. p. 795. 5. *Scotia* Illuſtrata; ſive Prodromus Hiſtoriæ Naturalis, &c. Auth. *Rob. Sibbaldo*, Equite Aurato. *Edinburgi*, 1684. in *Fol.*

n. 262. p. 543. 6. An Account of the Iſlands of *Orkney*; by *Ja. Wallace*, M. D. To which is added, an Eſſay concerning the *Thule* of the Antients. *Lond.* in 8*vo.*

n. 141. p. 1030. 7. A Diſcourſe of the State of Health in the Iſland of *Jamaica*, with a Proviſion calculated for the ſame, from the Air, the Place, and the Water; the Cuſtoms and Manner of Living, &c. By *Tho. Trapham*, M. D.

n. 85. p. 5021. 8. *New England*'s Rarities diſcovered; together with the Remedies uſed by the Natives to cure their Diſeaſes, Wounds and Sores, &c. By *J. Joſſelin*, Gent. *Lond.* 1672. in 12*mo.*

n. 170. p. 980. 9. Deſcription de la *Loviſiane*, nouvellement decouverte au *Sud Oueſt* de la *Nouvelle France*; par *Lovis Hennepin*, Miſſionnaire Recollect. &c. à *Paris*, 1683. in 8*vo.*

n. 91. p. 5170. 10. Obſervations Topographical, Moral, and Phyſiological, made in a Journey through Part of the *Low-Countries*, *Germany*, *Italy*, and *France*; by *J. Ray*, *F. R. S.* Whereunto is added, a brief Account of *Fran. Willoughby*, Eſq; his Voyage through a great Part of *Spain*. *Lond.* 1673. in 8*vo.*

n. 66. p. 2017. 11. *Jo. Battiſta Donius* de Reſtituenda Salubritate *Agri Romani*.

n. 149. p. 268. 12. Hiſtoria Naturalis *Helvetiæ* Curioſa. Auth. *Joh. Jacobo Magnero*, M. D. *Tiguri*.

n. 94. p. 6049. 13. A brief Account of ſome Travels in *Hungaria*, *Servia*, *Bulgaria*, *Macedonia*, *Theſſaly*, *Auſtria*, *Styria*, *Carinthia*, *Carniola*, *Friuli*, &c. by *Edward Brown*, M. D. *Lond.* in 4*to.*

14. An Account of ſeveral Travels through a great Part of *Germany*; by n. 130. p. 767.
Edw. Brown, M. D. *Lond.* 1677. in 4*to*.

15. A Collection of curious Travels and Voyages, in two Tomes: The n. 200. p. 763.
firſt containing Dr. *Leonhart Rauwolff*'s Itinerary into the *Eaſtern* Countries,
&c. The ſecond taking in many Parts of *Greece*, *Aſia Minor*, *Egypt*, *Arabia*, &c. from the Obſervations of M. *Belon*, Mr. *Vernon*, Dr. *Spon*, Dr.
Smith, Dr. *Huntingdon*, Mr. *Greaves*, and others. To which are added
three Catalogues of *Plants* growing in the *Levant*. By *J. Ray*.

16. The Hiſtory of *Poland*, in ſeveral Letters to Perſons of Quality; n. 238. p. 98.
giving an Account of the *antient* and *preſent State* of that Kingdom, Hiſtorical, Geographical, Phyſical, Political, and Eccleſiaſtical, *&c.* with ſeveral Letters relating to Phyſick. Vol. I. To which is added a new Map of
Poland. By *Bern. Conner*, M. D. *Lond.* 1697. in 8*vo*.

17. A Deſcription of the Iſlands and Inhabitants of *Feroë*, &c. written in n. 119. p. 456.
Daniſh; by *Lucas Jacobſon Debes*, A. M. *Engliſhed* by *J. S.* Doctor of
Phyſick, in 12*mo*.

18. Johannis Schefferi *Laponia*, &c. *Francofurti*, 1673. in 4*to*. n. 102. p. 31.

19. A Narrative of ſome Obſervations made upon ſeveral Voyages under- n. 109. p. 197.
taken to find a Way for ſailing about the *North* to the *Eaſt-Indies*, and for
returning the ſame Way from thence hither: Together with Inſtructions
given by the *Eaſt-India Company* for the Diſcovery of the famous Land of
Jezzo, near *Japan*. To which is added a Relation of ſailing through the
Northern America to the *Eaſt-Indies*; by *Dirick Rembrantz van Nierop*, at
Amſterdam, 1674. in 4*to*, abridged here.

20. Beſchriving der *Ooſt Indiſche* kuſten, *Malabar*, *Coromandel*, *Ceylon*, n. 80. p. 3088.
&c. Door *Philippus Baldæus*. T. *Amſterdam*, 1672. in *Fol.* n. 14 p. 248.

21. Relations of divers curious Voyages; by M. *Thevenot*. n. 89. p. 5128.

22. Relation du Voyage de l' Eveſque *De Beryte*, par la *Turquie*, la *Perſe*, n. 18. p. 327.
les *Indes*, &c. juſques au Royaume de *Siam*, & autres Lieux; par M. *de
Bourges*.

23. A Continuation of the Memoirs of M. *Bernier*, concerning the Em- n. 75. p. 2263.
pire of the *Great Mogul*. *Engliſhed* out of *French*. *Lond.* 1671. in 8*vo*.

24. The ſix Voyages of *John Baptiſta Tavernier*, Baron of *Aubonne*, n. 129. p. 711.
through *Turky* into *Perſia* and the *Eaſt-Indies*. In *Engliſh*. *Lond.* 1678. in n. 130. p. 751.
Folio. n. 137. p. 942.

25. A New Account of *Eaſt-India* and *Perſia*, in eight Letters; being n. 244. p. 338.
nine *Years* Travels; begun 1672. and finiſhed 1681, *&c.* by *J. Fryar*,
M. D. *Lond.* 1698. in *Fol.*

26. Voyage de *Siam* des Peres *Jeſuites*, Envoyez par le Roy aux *Indes* à n. 185. p. 249.
la *Chine*, à *Paris*, 1686. in 4*to*.

27. *Athanaſii Kircheri China* Illuſtrata. n. 26. p. 484.

28. Hebdomas obſervationum de Rebus *Sinicis*; Auth. *Andrea Mullero* n. 136. p. 919.
Greiffeinhagio. Coloniæ Brandenburgiæ, *An.* 1674.

29. Nouveaux Memoires ſur l'Etat Preſent de la *Chine*; par le L. P. n. 229 p. 585.
Louis le Conte S. J. *Amſterd.* 1697. in 12*mo*. 2 Vols. Tranſlated into
Engliſh, in 8*vo*.

*n.*48.*p.*973. 29. An hiſtorical Eſſay, endeavouring a Probability that the *Language* o *China* is the *Primitive Language*; by *J. Webb*, Eſq; *Lond.* 1669. in 8*vo.*

*n.*71.*p.*260. 30. Relatione dello *Stato Preſente* dell' *Egypto* ſcritta dal. Sig. *Gio. Michaele Vanſlebio.* In *Parigi*, in 1670. in 12*mo.*

*n.*48.*p.*972. 31. Hiſtoria General de *Ethiopia a Alta*; per lo Padre *Balthaſar Tellez.* Em *Conimbra. An.* 1660. in *Fol.*

*n.*14.*p.*251. 32. The Cauſes of *Inundations* of the *Nile*; by M. *De la Chambre.*

*n.*8.*p.*145. 33. Iſ. Voſſius de Nili & aliorum Fluviorum Origine.

*n.*17.*p.*304. *n.*108.*p.*182. 34. Die *Africaniſche* Landſchaft *Fetu* beſchrieben; durck *Wilhelm. Johan. Muller* von *Hamburgh*; Gedruckt zu *Hamburgh*, 1673. in 12*mo.*

*n.*211.*p.*166. 35. An Account of ſeveral late Voyages and Diſcoveries to the South and North, towards the *Streights* of *Magellan*, the *South Seas*, the vaſt Tracts of Land beyond *Hollandia Nova*, &c. alſo toward *Nova Zembla*, *Greenland* or *Spitſberg*, *Groynland* or *Engronland*, &c. By Sir *J. Narborough*, Capt. *Taſman*, Capt. *J. Wood*, and *Fred. Marten* of *Hamburgh.* To which are annexed, a large Introduction and Supplement. The whole illuſtrated with Charts and Figures. *Lond.* 1694. in 8*vo.*

*n.*240.*p.*196. 36. Voyages and Diſcoveries in *South America*: The firſt up the *River* of *Amazons* to *Quitto* in *Peru*, and back again to *Braſil*; performed at the Command of the King of *Spain*, by *Chriſt. D' Acugna.* The ſecond up the *River of Plate*, and thence by Land to the Mines of *Potoſi*; by M. *Acarete.* The third from *Cayenne* into *Guaiana*, in ſearch of the Lake of *Parima*, reputed the richeſt Place in the World; by M. *Grillet* and *Bechamel.* Done into *Engliſh* from the Originals; being the only Accounts of thoſe Parts hitherto extant, with Maps. *Lond.*

*n.*225.*p.*426. 37. An Account of a New Voyage round the World; by *Will. Dampier. Lond.* 1697. in 8*vo.*

CHAP. IV.

Miſcellaneous Papers.

A New Lamp; *by Mr.* Rob. Boyle. *Ph. Coll. n.* 2. *p.* 33. *Fig.* 76. I. 1. *A B C D* is a *Veſſel* of *Latten*, well *ſoldered* every-where.

B C, *E F*, are two *Bottoms*, *ſoldered* to that *Veſſel.*

F G is a *Pipe ſoldered* to the *Bottoms* aforeſaid, and whoſe *Aperture* is in the *great Cavity F A.*

H is a *Hole* in the *Pipe F G*, opening between the two *Bottoms B C*, *E F.*

I is another *Hole*, to which is *ſoldered* a *Pipe I G*, bended upwards at *G.*

P P is a little *Veſſel* fit to receive the *Wick* of the *Lamp.*

L M is a ſlender *Pipe*, open at both Ends, and *ſoldered* to the *Cover A D* in *L*, and to the *Bottom E F* in *M*; ſo that, by that *Pipe*, the external Air may communicate, between the two *Bottoms*, without penetrating into the *Cavity*, *A F*.

N is a ſhort *Pipe*, ſolder'd to a *Hole* in the *Cover A D*, ſo that thereby one may pour *Oil* into the *Cavity A F*, and ſtop it afterwards very cloſe with a *Cork*.

For the *filling* up of this *Engine*, you muſt ſtop the *Aperture G*, of the *Pipe I G*, with a long Pin fitted for that Purpoſe; and the upper End of the *Pipe L M* muſt be ſtopped too: Then pour in your *Oil* by the *Aperture N*, which done, this ſame *Aperture N* is to be *ſhut* up exactly, and both the other to be *opened*, viz. *G* and *L*. Then it will come to paſs, that the *Oil*, through the *Pipe I G*, will run and fill the *Veſſel P*, till its Superficies be in the ſame *Level* with the *Hole H*, and no more, as might be eaſily demonſtrated.

Now it is eaſy to ſee, that this *Lamp* is free from all *Inconveniencies* the *Lamp* of *Cardan* is ſubject to: For,

1. The *Air* doth not get into it by Starts or Gluts, as it doth in *Cardan*'s *Lamp*; but when the *Oil* in *P P*, being *waſted* by the *Flame*, comes to have its Superficies lower than the *Hole H*, the *Oil* from the *Cavity A F* runs into *P P* gently, becauſe its Place left in the *Cavity A F* is eaſily ſupplied by the *external Air*, which, through the *Pipe L M*, and the *Hole H*, gets up into the ſaid *Cavity A F*.

2. When the *Air* contained in the *Cavity A F* comes to be *rarefied* by ſome *Heat*, it drives out much *Oil*, and ſo is able to choak *Cardan*'s *Lamp*; but in this, the *Oil* being ſo driven out, gets into the Space between the two *Bottoms*, as well as into the *Veſſel P P*. Now the ſaid Space between the two *Bottoms*, by reaſon of its Largeneſs, receiving *twenty* or *thirty* times more *Oil* than the *Veſſel P P*, it follows, that the Superficies of the *Oil* therein riſeth 20 or 30 times leſs than if all the *Oil* had been driven into the ſaid *Veſſel*: Therefore, when we *fill* the *Lamp*, we muſt take care that the *Pipe L* may be well *ſhut*, ſo that the *Air* between the two *Bottoms*, finding no Iſſue, may keep the *Oil* from filling that Space, which by that means, when the *Hole L* is open, will be fit to receive the *Oil* driven out by the *Rarefaction* of the *Air* in the *Cavity A F*.

3. The *Oil* being always kept at the ſame Diſtance from the *Flame*, the *Wick* will not be quickly *conſumed*.

4. You have the Conveniency to put *new Oil* into the *Lamp*, without moving or extinguiſhing the ſame; for you need but ſhut up *G* and *L*, and pour the *Oil* through *N*, as hath been ſaid in the Beginning.

2. Let a *Lamp*, made two or three *Inches* deep, with a *Pipe* coming from the Bottom, almoſt as high as the Top of the Veſſel, be filled firſt with *Water*, ſo high as to cover the *Hole* of the *Pipe* at the Bottom; to the end the *Oil* may not get in at the *Pipe* (and ſo be loſt); then let the *Oil* be poured in ſo as to fill the *Veſſel* almoſt brim-full, which muſt have a *Cover* pierced with ſo many *Holes* as are deſigned to be *Wicks*: When the *Veſſel* is thus filled, and the *Wicks* are lighted, if *Water* falls in by Drops at the *Pipe*, it will keep the *Oil* always at the *ſame Height*, or very near, the

Another, by Dr. Rob. St. Clare. *n.* 245. *p.* 380.

Weight of *Water* to that of *Oil* being, according to *Kircher*'s *Table*, $20\frac{8}{11}$ to 19, which in two or three *Inches* will make no conſiderable Difference. If the *Water* runs faſter than the *Oil* waſtes, it will only run over at the Top of the *Pipe*; what does not run over, will come under the *Oil*, and keep it to the ſame Height.

Perpetual Lamps *in Imitation of the* ſepulchral Lamps *of the* Antients; *by* *Dr.* Ro. Plott. *n.* 166. *p.* 806.

II. I have often heard it aſſerted, that a *metalline Wire*, eſpecially of the beſt *refined Gold* (whoſe Prerogative is, not to be *diminiſhed* by *Fire*) will lick up *Oil*, and ſo make a *perpetual Flame*, provided it be ſupplied with a *perpetual Oil:* But I found (upon *Trial)* in a *Faggot* of *Wire* made of annealed *Iron*, of a ſuitable Bigneſs for a *Wick*, it would not ſucceed by any manner of Means I could readily think of; nor have I much Reaſon to think it will, either in *Wire* of *Silver* or *Gold*, the Nature of them all ſeeming not much different, as to this Particular. If, therefore, it be neceſſary that we muſt have a *perpetual Wick* for the making ſuch *perpetual ſepulchral Lamps* as were uſed by the *Antients*, I think we muſt make uſe of *Linum Aſbeſtinum*, *Earth Flax*, or *Salamanders Wool*, which will do the Office of a *Wick* tolerably well; and if it can any way be ſupplied with a *perpetual Oil* (as I ſhall preſently ſhew you), I hope you will not judge me far from effecting the Matter. Now that there may be ſuch a *Bitumen*, or *inexhauſtible Oil*, I will carry you no farther than *Pitchford* in *Shropſhire* to ſhew you: For there is a *Naphtha*, or *liquid Bitumen*, that conſtantly iſſues forth with a *Spring* there, and floats upon the Water: This I would have *ſeparated*, before it joins with the Water, into a *Ductus* of its own, and ſo conveyed to the Place thought moſt convenient for ſuch a *Lamp*, into which it ſhould as *perpetually* diſtil, as it does now into the *Fountain*; which, I doubt not, may be done without any great matter of Difficulty; and, if ſo, we have an *Oil* as *everlaſting* as our *Wick:* Nor need we to fear any *Extinction* if incloſed in a *Tomb* or *Vault* under-ground, in never ſo damp or moiſt a Place; it being the *Characteriſtick* of a *Bitumen*, to burn beſt where there is Moiſture; as is evident, upon Aſſuſion of Water upon *Sea-coal.* And this is one Way I have thought of that ſuch a *perpetual ſepulchral Lamp* might poſſibly be contrived.

Vid. *Vol.* II. *Chap.* III. *Sect.* XCII. & XCIII.

But if you will be ſo ſtrict with me, as not to allow this to be a *perpetual Wick*, or that it is probable one ſhould be made any other Way; as unlikely may it ſeem, that there was ever any ſuch thing as a *perpetual Lamp*, notwithſtanding the Teſtimonies of St. *Auſtin*, *Plutarch*, *Pliny*, *Ludovicus Vives*, *Baptiſta Porta*, *Licetus*, *Pancirollus*, and divers others; whereof ſome are ſaid to have burnt 1000, ſome 1500 *Years.* But I dare not think ſo many, and ſo very good Authors, have all impoſed upon us; or that it is almoſt poſſible that ſo many notable Inſtances as are brought for them, ſhould all be falſe: Much rather, therefore, ſhall I determine (than wholly explode the Thing), that the *Liquor* of theſe *Lamps* did *burn* without any *Snuff* or *Wick* at all; as we ſee *Camphire* and moſt *Bitumens* will; it not being expreſſed (that I remember) in any of the Relations of theſe *Lamps*, that they were found with any *Wicks:* Whence both the Inconveconveniencies above-mentioned attending a *Wick*, *ipſo facto*, ceaſe. It only therefore remaining, that we find out an *inexhauſtible Oil*, which, conveyed to a fit Veſſel, might cauſe ſuch a *Lamp*; why may not our *Bitumen* at *Pitchford* ſerve the Turn? Which, no queſtion, will *burn* without a *Wick*, as well as any other *liquid Bitumen*. All the Objection I can foreſee that is likely to obtain Advantage againſt ſuch an Experiment is, that ſuch a *Lamp* as this would as likely *burn* in the *open Air*, as in an *incloſed damp Vault*; whereas the *Lamps* of the *Antients* did nouriſh their *Flame* beſt where there was moſt *Want* of *Air*, only in *cloſe Vaults* and *Tombs*, and were preſently *extinguiſhed* upon the leaſt Immiſſion of *external Air*; theſe being Qualities neceſſary, and almoſt always aſſerted as Concomitants of the *antient ſepulchral Lamps*. To which I anſwer, firſt, that ſome of the *Lamps* of the *Antients* did as well burn in the *open Air*, as in *cloſe damp Vaults*; as that mentioned by St. *Auſtin* in his Book *De Civitate Dei*, which hung in the *Temple* of *Venus* always expoſed to the *open Weather*, yet was never either *conſumed* or *extinguiſhed*. The *Lamp* alſo found in the *Tomb* of *Pallas* the *Arcadian*, ſlain by *Turnus* in the *Trojan War*, was of this Kind, which remained *burning* after it was taken forth, notwithſtanding either *Wind* or *Water*, with which ſome did endeavour to quench it. Now admitting our *Lamp* at *Pitchford* ſhould thus *burn* indifferently, under both Circumſtances, what are we the worſe? Since I never heard that the *Lamp* mentioned by St. *Auſtin*, or of *Pallas*, were ever the leſs eſteemed or admired, becauſe they could not be extinguiſhed by the *open Air*, as moſt of the reſt have been ſaid to be.

But if any-body be ſo nice, that he muſt have an *Oil* in all Particulars anſwerable to that other Sort of the *Antients*, that *burns* beſt where there is *want* of *Air*, and is deſtroyed by its Admiſſion; let him but go with me into *Flintſhire* to the *Coal-works* of Sir *Roger Moſtyn* of *Moſtyn* in that County, and he may have Satisfaction; where the *Miners*, when they have dug ſo deep, that they begin to perceive a *Want* of *Air*, find a *blueiſh Flame* to begin to kindle of itſelf in the Fiſſures of the *Coal* (they ſometimes light their *Candles*), which *blazes*, and moves up and down *continually*, and ſometimes *ſhines* too upon the Surface of the Water in the Bottom of the Pits, ſhewing all the Colours of the *Rainbow*; which yet, upon drawing up of the Water that annoys the Works, and thereby ſtirring the *Air*, will leave off *burning*: But as they ſink lower, and are more remote from the *Day*, or *ſuperterraneous Air*, it ſtill increaſes upon them. Whence it plainly appears, that this is a Sort of *Fire* that ſo little requires *Air* for the Maintenance of it, that it *burns* beſt when there is leaſt *Air*, and is *extinguiſhed* when diſturbed by the Motion of it; as the *antient Lamps* are ſaid to be upon the Immiſſion of *external Air*. The ſame Sort of *Fire* has alſo been taken notice of, in the *Coal-works* of *Somerſetſhire*, by the ingenious Mr. *Beaumont*, and by Mr. *George Sinclair* in the *Coal-works* of *Scotland*. This I doubt not but you will readily allow me to be as probable a Material for the *Oil* of this *ſecond* Sort of *perpetual Lamps*, as that of *Pitchford* was for the

Vid. *Vol.* II. *Chap.* III. *Sect.* VII. 4.

the former: But how this or that ſhall be ſo managed as to be put into a *Lamp*, and this *Lamp perpetually* ſupplied, and placed where-ever it ſhall be deſired, as it ſeems the *Lamps* of the *Antients* might, this *Fire* being ſometimes found in little *Pots*, *Glaſſes*, or *Urns*, without any ſuch *Ductus* to them, as we required at *Pitchford*, or might do here, is a Difficulty perhaps not ſo eaſily conquered. To which I muſt confeſs that I have only this to ſay, that unleſs there can be a Preparation chymically made out of theſe *bituminous* Materials, which thus naturally *take fire* of themſelves, or preſerve it without a *Wick*, a ſmall Quantity whereof ſhall maintain ſo tenuious a *Flame* as that there ſhall be no conſiderable Conſumption of the Matter in many *Years* (ſuch as the *Flame* over the *Well*, and *Earth* about it, in one Mr. *Hawkley*'s Ground in *Lancaſhire*, that, like the *Fire* of *Plato*, only *ſhines*, and does not *burn*); we muſt be contented to be tied to the Places where theſe Materials are.

Vide *Vol.* II. *Chap.* III. *Sect.* VIII.

But if we can be content to quit theſe Materials, and to think that theſe *Lamps* (as many have done) did not *ſhine* or *burn* for all the Time they were incloſed in thoſe *Tombs*, but were only *inkindled* by the Admiſſion of *Air*, when opened; I have thought of a Way not at all liable to any of the Defects or Inconveniencies of the two former Ways, whereby a *Glaſs* of *Liquor*, incloſed in another (like the *Urns* of *Olybius*), upon Immiſſion of *external Air*, ſhall certainly *ſhine*, though it did not ſo before: And it is this; Take a ſmall Phial, into which put a little of the *liquid Phoſphorus* (which, you all know, if the Phial be ſtopt, *ſhines* not at all); include this in the *Recipient* of an *Air-Pump*, out of which if the *Air* be well *exhauſted*, the *ſolid Phoſphorus* itſelf will leave off *ſhining* in ten Hours time, though in the *Summer Quarter*, and the *liquid* in fewer; ſo that it ſhall ſhine no more, than when the Bottle containing it is ſtopt with a *Cork*. Now let ſuch an *exhauſted Recipient*, with the included *Phoſphorus*, be placed in a *Tomb* or *Vault*, which are commonly dark, and, if ever found, and the outer Glaſs broken (as uſually ſuch Things are, by ignorant Men employed in digging), poſſibly there will appear, upon Immiſſion of the *Air*, as good a *perpetual Lamp* as ſome that have been found in the *Sepulchres* of the *Antients*; though, in all Probability, of a different Kind from all, or moſt of them.

An Account of an Engine that conſumes Smoke; *by M.* Juſtel. *n.* 181. *p.* 78.

Fig. 77.

III. M. *Daleſme* has found out a *Machine*, which, though very little, and portable, *conſumes* all the *Smoke* of all Sorts of *Wood* whatſoever, and that ſo, that the moſt curious *Eye* cannot diſcover it in the Room, nor the niceſt *Noſe* ſmell it, although the *Fire* be perfectly open. This *Engine* is compoſed of ſeveral Hoops of hammered *Iron*, of about four or five *Inches* Diameter, which ſhut one into the other; it ſtands upright in the Middle of the Room, upon a ſort of *Trevet* made on purpoſe: *A* is the Place where the *Fire* is made, where, if you put little Pieces of *Wood*, it will not make the leaſt *Smoke* neither at *A*, nor *B*, over which you cannot hold your Hand within *Half* a *Foot*, there comes out ſo great a *Heat*. If you take

take one of theſe Pieces of *Wood* out of the *Fire* at *A*, it *ſmokes* preſently; but ceaſes immediately, ſo ſoon as it is caſt into the *Fire* again. The moſt *fetid* Things, as a *Coal* ſteep'd in *Cats-piſs*, which *ſtinks* abominably when taken out of the *Fire*, notwithſtanding in this *Engine* makes not the leaſt *ill Scent*; the ſame did *Red Herrings* broiled thereon. On the other Side all *Perfumes* are loſt in it, and *Incenſe* makes no *Smell* at all, when *burnt* therein. We learnt, that this is not ſhewn but when the *Fire* at *A* is well kindled, and the *Tunnel B D* very *hot*, ſo that the *Air* that feeds the *Fire* cannot come that Way, but muſt all preſs in upon the open *Fire*, whereby the *Smoke* and *Flame* is all forced inwards, and muſt paſs through the Heap of *burning Coals* in the *Furnace A*; in which Paſſage the Parts thereof are ſo diſperſed and refined, that they become *inoffenſive* both to the *Eye* and *Noſe*.

Some Suggeſtions for Remedies *againſt* Cold; *by* . . . . . *n.* 21. *p.* 379.

IV. The beſt Remedies againſt *Cold* are ſuch as retain *Heat*, or continue *Fire* longeſt. To this Purpoſe ſome have taken Notice, That *Joiners* uſe *Leaden Pots* for their *Glue*, alleging for a Reaſon, that *Lead*, being a cloſe Metal, retains the *Heat* longer than other Metals. *Cary's Warming-ſtone* promiſed a Warmth for ſix or eight *Hours*; if it performed but for two or three *Hours*, it would be of great Uſe. It is found by ſad Experience, how hurtful *bright Fires*, and eſpecially of *Stone-coal*, are to the *Eyes*.

To retain *Fire* long, certain *black Earths* are uſeful, as we were lately informed by the inquiſitive Dr. *B*. That a Gentleman in *Somerſetſhire*, called Mr. *Speke*, had bountifully obliged *Ilminſter*, and his Neighbourhood, by a *black fat Earth* lately found in his *Park*: But the ſame Correſpondent adds, that he never ſaw any parallel to a *Sea Weed*, which he and his Fellow Students had in *Cambridge*, in the Mouth of a *Barrel* of good *Oyſters*. It was ſmaller than *Peas-balm*, yet cut, it laſted two very great *Fires* of *Sea-Coal*, burning bright in the midſt of the *Fire*; and by a Stroke of the Tongs it fell into the *Hearth*, *jingling* like *Metal*.

Obſervations on ſhining Fiſh; *by Dr.* Beal. *n.* 13. *p.* 226.

V. *May* 5. 1665. Freſh *Mackrels* were boiled in Water, with *Salt* and *Sweet Herbs*; and, when the Water was perfectly cold, the next Morning, the *Mackrels* were left in the Water for *Pickle*.

May 6. More freſh *Mackrels* were boiled in like Water, and *May* 7. both Water and *Mackrels* were put into the former Water, together with the former *Mackrels* (which Circumſtances I do particularize, becauſe whether the Mixture of the *Pickle* of ſeveral Ages, and a certain Space of Time, or whatever elſe was neceſſary and wanting, the Trial did not ſucceed with the like Effect at other Times).

But now on *May* 8. Evening, the Cook ſtirring the Water, to take out ſome of the *Mackrels*, found the Water, at the firſt Motion, become very *luminous*, and the *Fiſh ſhining* through the Water, as adding much to the *Light* which the Water yielded. The Water, by the Mixture of *Salt* and

Herbs in the Boiling, was of itſelf thick, and rather *blackiſh*, than of any other Colour; yet, being ſtirred, it *ſhined*, and all the *Fiſh* appeared more brightly *luminous*, in their own Shapes.

Where-ever the Drops of this Water (after it was ſtirred) fell on the Ground, or Benches, they *ſhined*; and the Children took Drops in their Hands, as broad as a *Penny*, running with them about the Houſe; and each Drop, both near and at a Diſtance, ſeemed, by their *ſhining*, as broad as a *Sixpence*, or a *Shilling*, or broader.

The Cook turned up the Side of the *Fiſh* which was loweſt, and thence came no *ſhining*; and after the Water was for ſome good time ſettled, and fully at Reſt, it did not *ſhine* at all.

On *Tueſday* Night *May* 9. we repeated the ſame Trial, and found the ſame Effects: The Water, till it was ſtirred, gave no *Light*, but was thick and dark, as we ſaw by *Day-light*, and by *Candle-light*; as ſoon as the Cook's Hand was thruſt into the Water, it began to have a *Glimmering*; but being gently ſtirred by the Hand moving round, it did ſo *ſhine*, that they who looked on it at ſome Diſtance from the further End of another Room, thought verily it was the *ſhining* of the *Moon* through a Window upon a Veſſel of *Milk*; and by briſker Circulation it ſeemed to *flame*.

The *Fiſh* did then *ſhine* as well from the Inſide as the Outſide, and chiefly from the *Throat*, and ſuch Places as ſeemed a little broken in the boiling. I took a Piece that *ſhined* moſt, and fitted it as well as I could deviſe in the Night, both to my great *Microſcope*, and afterwards to my little one; but I could diſcern no *Light* by any of theſe *Glaſſes*, nor from any Drops of the *ſhining* Water, when put into the *Glaſſes*. And *May* 10. in the brighteſt Rays of the *Sun*, I examined, in my great *Microſcope*, a ſmall broken Piece of the *Fiſh*, which *ſhined* moſt the Night before; we could find nothing on the Surface of the *Fiſh* very remarkable: It ſeemed *whitiſh*, and, in a manner, dried, with deep Inequalities; and others, as well as myſelf, thought, we ſaw a Stream, rather *darkiſh* than *luminous*, ariſeing, like a very ſmall Duſt, from the *Fiſh*; and rarely, here and there, a very ſmall and almoſt imperceptible *Sparkle* in the *Fiſh*: Yet of theſe *Sparkles* we are certain; we numbered them, and agreed in the Number, Order, and Place. Of the *Steam* I am not confident, but do ſuſpect our *Eyes* in the *bright Sun*; or that it might be ſome *Duſt* in the *Air*.

The great *Microſcope* being fitted in the Day-light for this Piece of *Fiſh*, we examined it that Night, and it yielded no *Light* at all, either by the View of the *Glaſs*, or otherwiſe.

Finding it *dry*, I thought that the Moiſture of *Spittle*, and touching of it, might cauſe it to *ſhine*: And ſo it did, though but a very little, in a few ſmall Sparks, which ſoon *extinguiſhed*. This we ſaw with the *bare Eye*, not in the *Glaſs*.

The *Fiſh* were not yet *fetid*, nor inſipid to the beſt diſcerning Palates; and I cauſed two *Fiſhes* to be kept, for further Trial, two or three *Days* longer, till they were *fetid* in very hot Weather; and then I expected more *Brightneſs*, but could find none, either in the *Water*, by ſtirring it, or in the *Fiſh* taken out of the Water.

Obſervations about ſhining Fleſh; *by Mr.* Rob. Boyle. *n.* 89 *p.* 5108.

VI. 1. *March* 15. 167 . When I was about to go to Bed, an *Amanuenſis* of mine informed me, that one of the Servants of the Houſe going, upon ſome Occaſion, into the *Larder*, was frighted by ſomething of *luminous* that ſhe ſaw (notwithſtanding the Darkneſs of the Place) where the *Meat* had been hung up before: Whereupon I preſently ſent for the *Meat* into my Chamber, and cauſed it to be placed in a Corner of the Room, being made conſiderably dark; and then I plainly ſaw, both with Wonder and Delight, that the Joint of Meat did, in divers Places, *ſhine* like *rotten Wood* or *ſtinking Fiſh*. The chief Circumſtances and *Phænomena* that I had Opportunity to take Notice of, at ſo inconvenient an Hour, were theſe:

1. That the Subject we diſcourſe of was a *Neck* of *Veal*, which had been bought of a Country Butcher on the *Tueſday* preceding.

2. In this one Piece of *Meat* I reckoned diſtinctly above twenty ſeveral Places that did all of them *ſhine*, though not all of them alike, ſome of them doing it but very faintly.

3. The Bigneſs of theſe *lucid* Parts was differing enough, ſome of them being as big as the *Nail* of a Man's middle *Finger*, ſome few bigger, but moſt of them leſs; nor were their Figures at all more uniform, ſome being inclined to a *round*, others almoſt *oval*, but the greateſt Part of them very irregularly ſhaped.

4. The Parts that *ſhone* moſt were, ſome *griſtly* or ſoft Parts of the *Bones*, where the *Butcher's Cleaver* had paſſed; but theſe were not the only Parts that were *luminous*; for, by drawing to and fro the *Medulla Spinalis*, we found, that a Part of that alſo did not *ſhine* ill; and I perceived one Place in a *Tendon* to afford ſome *Light*; and, laſtly, three or four Spots in the *fleſhy* Parts, at a good Diſtance from the *Bones*, were plainly diſcovered by their own *Light*, though that were fainter than in the Parts above-mentioned.

5. When all theſe *lucid* Parts were ſurveyed together, they made a very ſplendid Shew; ſo that, applying a printed Paper to ſome of the more *reſplendent Spots*, I could plainly *read* divers conſecutive *Letters* of the *Title*.

6. The Colour that accompanied the *Light* was not in all the ſame; but in thoſe which ſhone livelieſt it ſeemed to have ſuch a fine *greeniſh Blue*, as I have divers Times obſerved in the *Tails* of *Gloworms*.

7. But notwithſtanding the Vividneſs of this *Light*, I could not, by the Touch, diſcern the leaſt Degree of *Heat* in the Parts whence it proceeded; and, having put ſome Marks on one or two of the moſt *ſhining* Places, that I might know them again when brought to the Light, I applied a *ſealed Weather-glaſs*, furniſhed with *tincted Spirit* of *Wine*, for a pretty While, and could not ſatisfy myſelf that the *ſhining* Parts did at all ſenſibly warm the *Liquor*.

8. Notwithſtanding the great Number of *lucid* Parts in this *Neck* of *Veal*, yet neither I, nor any of thoſe that were about me, could perceive, by the *Smell*, the leaſt Degree of *Stink*, whence to infer any *Putrefaction*; the *Meat* being judged very freſh, and well conditioned, and fit to be dreſſed.

9. The Floor of the *Larder*, where this *Meat* was kept, is almoſt a Story lower than the Level of the Street, and it is divided from the Kitchen but by a Partition of Boards, and is furniſhed but with one Window, which is not great, and looks towards the Street, which lies *northward* from it.

10. The *Wind*, as far as we could obſerve it, was then at *South-weſt*, and bluſtering enough; the *Air*, by the *ſealed Thermoſcope*, appeared hot for the Seaſon, the *Moon* was paſt its *laſt Quarter*; the *Mercury* in the *Barometer* ſtood at 29$\frac{1}{16}$ *Inches*.

11. We cut off with a Knife one of the *luminous* Parts, which proved to be a tender *Bone*, and, being about the Thickneſs of a *Half Crown* Piece, appeared to *ſhine* on both Sides, though not equally; and that Part of the *Bone* whence this had been cut off, continued joined to the reſt of the *Neck* of *Veal*, and was ſeen to *ſhine*, but nothing near ſo vividly as the Part we had taken off did before.

12. To try whether I could obtain any *Juice* or moiſt Subſtance from this, as I have ſeveral Times done from the *Tails* of *Gloworms*, I rubbed ſome of the ſofter and more lucid Parts, as dextrouſly as I could, upon my Hand; but I did not at all perceive any *luminous Moiſture* was thereby imparted; though the *Fleſh* ſeemed, by that Operation, to have loſt ſome of its *Light*.

13. I cauſed alſo a Piece of *ſhining Fleſh* to be compreſſed betwixt two Pieces of *Glaſs*; but I did not find the *Light* to be thereby *extinguiſhed*.

14. I put a *luminous* Piece of *Veal* into a *cryſtalline* Phial, and, pouring on it a little pure *Spirit* of *Wine*, after I had ſhaken them together, I laid by the Glaſs, and in about a *Quarter* of an *Hour*, or leſs, I found that the *Light* was *vaniſhed*.

15. But *Water* would not ſo eaſily quench our ſeeming *Fires*; for having put one of them into a *China* Cup, and almoſt filled it with *cold Water*, the *Light* did not only appear, perhaps, undiminiſhed, through that Liquor, but, above an *Hour* after, was vigorous enough not to be *eclipſed* by being looked upon at no great Diſtance from a burning Candle.

16. While theſe Things were doing, I cauſed the *pneumatical Engine* to be prepared in a Room without Fire (that the Experiment might be tried in a greater Degree of *Darkneſs*); and having conveyed one of the largeſt *luminous* Pieces into a ſmall *Receiver*, we cauſed the *Pump* to be plied in the Dark; and perceived, upon the gradual withdrawing of the *Air*, a gradual *leſſening* of the *Light*, which yet was never brought quite to *diſappear* (as I long ſince told you, the *Light* of *rotten Wood* and *Gloworms* had done), or to be ſo near *vaniſhing* as one would have expected. But by

the haſty Increaſe of *Light*, that diſcloſed itſelf in the *Veal* upon this letting in of the *Air* to the *exhauſted Receiver*, it appeared more manifeſtly than before, that the Decrement, though but ſlowly made, had been conſiderable. This Trial we once more repeated with a not unlike Succeſs, which, though it convinced us that the *luminous* Matter of our included Body was more vigorous or tenacious than that of moſt other *ſhining* Bodies; yet it left us ſome Doubts, that the *Light* would have been much more impaired, if not quite made to *vaniſh*, if the Subject of it could have been kept long enough in our *exhauſted Receiver*.

17. It was alſo found, that a *Leg* of the ſame *Veal* had ſome *ſhining* Places in it, though they were but very few, and faint, in Compariſon of thoſe that were conſpicuous in the above-mentioned *Neck*.

18. *March* 16. Between Four and Five in the Morning, I looked upon a clean *Phial*, that I had laid upon the Bed by me after a Piece of our *luminous Veal* had been included in it, and found it to *ſhine* vividly. I looked upon it again the third *Day* (incluſively) after we had firſt obſerved the *Meat*, it was cut off from, to be *luminous*; and I found it to *ſhine* in the Dark as vigorouſly as ever: The fourth *Day* its *Light* was alſo conſpicuous, ſo that I was able, in a dark Corner of the Room, to ſhew it, even in the *Day-time*, to three or four very ingenious Phyſicians; but before the Night following the *Light* began to decay, and the offenſive *Smell* to grow ſomewhat ſtrong; which ſeems to argue, that the Diſpoſition, upon whoſe Account our *Veal* was *luminous*, may very well conſiſt both with its being and not being in a State of *Putrefaction*, and, conſequently, is not likely to be derived merely from the one or the other. The fifth *Day*, in the Morning, looking upon it before the Curtains were opened, it ſeemed to *ſhine* better than it had done the Day preceding; the ſame Night, alſo, it was manifeſt enough, though not vivid, in the Dark: When I awaked the ſixth *Day* in the Morning, after the *Sun* was *riſen*, I could, within the Curtains, perceive a glimmering *Light*; but the ſeventh *Day* I could not, late at Night, diſcern any *Light* at all.

19. I ſhall only add, and conclude with, one Obſervation more, which may poſſibly take off our Thoughts from ſtriving to deduce the *ſhining* of our *Veal* from the peculiar *Nouriſhment*, or *Conſtitution*, or *Properties* of that *individual Calf*, whoſe *Fleſh*, &c. were *luminous*: For, having ſeveral Nights ſent purpoſely into the Larder, to obſerve whether any *Veal*, ſince brought thither, or any other *Meat*, did afford any *Light*; a negative Anſwer was always brought me back, ſave at one Time, which happened to be within leſs than forty-eight *Hours* of that at which the *Luminouſneſs* of the *Veal* had been firſt taken Notice of; for, at this Time, there was in the ſame *Larder* a conſpicuous *Light* ſeen in a *Pullet*, that hung up there; which having cauſed to be brought up in a darkened Place in my Chamber in the Night-time, I perceived four or five *luminous* Places, which were not indeed near ſo large as thoſe of the *Veal*, but very little leſs *vivid* than they: All of theſe I took Notice to be either upon or near the *Rump*; and that which appeared

moſt

moſt like a Spark of *Fire*, *ſhone* at the very Top of that Part: Yet was not this Fowl *mortified*, nor at all *ill-ſcented*, but ſo freſh, that the next Day I found it very good Meat.

By Dr. J. Beal. n. 125. p. 599. 2. 1. Upon *Friday* (*Feb.* 25. 1675-6.) a Woman of *Yeovil* in *Somerſetſhire* bought in the Market a *Neck* of *Veal*, which ſeemed well coloured, and well conditioned in every Reſpect: The *Calf*, a *Cow-calf*, was killed in the Evening the Day before; it was hung to a Shelf in a little Chamber, where ſhe and her Huſband lay; upon the following *Saturday*, about Nine in the Night, the *Neck* of *Veal ſhined* ſo bright, that it did put the Woman into a great Affrightment: She calls up her Huſband; he haſtens to the *Light*, as fearing *Fire* and Flames, and ſeeing the *Light* come only from the *Fleſh*, he caught the *Fleſh* in his Left Hand, and beat it with his Right Hand, as endeavouring to extinguiſh the *Flame*, but without Effect: The *Fleſh ſhined* as much, if not more, than before, and his Hand, with which he beat the *Fleſh*, became all in a *Flame*, as bright and vivid as the *Fleſh* of the *Veal* was; and ſo it continued, whilſt he went from Place to Place, ſhewing it to others. Then he thruſts his *blazing* Hand into a Pail of pure *Water*: This could not extinguiſh the *Flame* at all, but his Hand *ſhined* through the *Water*. At laſt he took a Napkin, and wiped his Hand, till he wiped off all the *Light*. The next Day (being *Feb.* 27.) the *Veal* was dreſſed, and ſome of the Neighbours, who ſaw it *ſhining*, were invited to eat of it; all eſteemed it as good as any they had eaten. A Part of it was kept for *Feb.* 28. and 29. in which Time it loſt nothing of its *Sweetneſs*.

2. And now I want not a Parallel in Conſort for that Part of this Relation, which ſeemeth ſtrangeſt: For on *Tueſday* (being *April* 4. 1676.) a fat *Pork* was killed for my Family; within two Days the *Guts*, or (as ſome call them) the *Chitterlings* and *Feet* of the *Pork* were boiled, and after they were thoroughly cold they were put, in due Order, in *Souſe-drink*, or *Pickle*, in a low Room on the North-ſide, which had little Light at Mid-day, and was very dark as ſoon as Night began. *April* 8. all thoſe Parts of the *Guts*, and the *Claws* of the *Feet*, which floated on the Top of the *Pickle*, began to *ſhine*, and the Parts immerſed under Water gave no *Light*; the Light increaſed daily more and more in all the Parts that floated. *April* 13. the *Light* ſeemed as bright as the brighteſt *Moon-ſhine*: Thus it continued to *ſhine* (but fainter and fainter, and in fewer Parts) almoſt a *Week* longer; for, being often tumbled up and down, by ſlow Degrees all ſunk into the *Pickle*, and then all the *Light* expired. Whilſt the *Light* was vivid, I cauſed a Maid-ſervant to rub one of her Hands upon the *ſhining* Part, after which ſhe came through three Rooms into the Place where I ſat, between a great Fire on one Side, and a Candle or two on a Table near at Hand, on the other Side; and in this Place ſhe ſhewed me her Hand, all over *ſhining*, as bright as *Moon-ſhine*: One, indeed, ſtood between her Hand and the Fire, another between her and the Candles. Thence I went into another Room, where there was but a ſmall Fire, and no Candle, but (at that Time) a little *Moon-ſhine* through a Window; there the *ſhining* Parts of her Hand, or indeed her Hand all over, appeared to be very bright *Flames*. Then I

cauſed ſome of the *ſhining Pork* to be brought into the ſame Room, and examined, whether the *Pickle* did not *ſhine*, and ſo might give the *flaming* Tincture to the Maid's Hand; but by wiping the *Pork* diligently with a Napkin, till it was perfectly dried, we found, that the *Flame* of the *Pork* was rather increaſed (as we all thought) than diminiſhed. Then I deſired all the Company (whereof ſome were young Children, which have the tendereſt *Touch*) to try, whether the moſt *flaming* Parts had any perceptible Degree of *Tepidity:* All agreed, that they could feel no Warmth, and that all the Parts of the *Pork* were manifeſtly *gelid*; but ſome thought that they perceived the *luminous* Parts leſs *gelid* than the *dark* Parts, others denied it: For my own Part, I found not ſo much Difference as could clear me from ſuſpecting a prepondering Fancy. After theſe Trials, the Maid wiped off the *Light* from her Hand, by rubbing her Hand ſtrongly with a Napkin, three or four times over.

3. I took Notice, that, by this acquired *Blaze*, the Face and Hands would appear a great deal larger than they were; and the Manner how it was done being concealed, the Learned and Ingenious might be at a Loſs to diſcover what it might be; ſo that it might fitly ſerve for an *Impoſture.*

4. Hiſtories report, of a ſudden and ſhort *Fulgor* about the Countenance of the *Living*, which they interpreted to preſage ſomething extraordinary, by which thoſe Perſons became illuſtrious; but of *dead Carcaſes*, which became thus *luminous*, I have read nothing in old *Records:* That *Mackrels* in their *Pickle* did caſt a *ſhining Blaze*, ſome Days before they were *ill-taſted*, or *ill-ſcented*, I gave you Notice *May* 5. 1665. ſince which Time I tried often to obtain the like, but without Succeſs; though I know not what Circumſtance was wanting.

Vid. ſup. *Sect.* V.

5. The *Pickle* in which the *Pork* was put was made only of *pure Water*, *Bran*, and *Bay-ſalt*, and was ſo far from *ſhining*, that it quenched the *Light*, by Degrees, of the *ſhining Fleſh*. The *Mackrel-pickle* (which was boiled with a Mixture of *Sweet-herbs*), by a little ſtirring, became ſo *luminous*, that a Drop of it in the Palms of Childrens Hands appeared as broad as a *Shilling*, or broader; ſo that a Waſh of it might alſo fitly ſerve for an *Impoſture.*

6. I think *ſhining Worms* are ſeldom found in *Oyſters*, as was formerly obſerved by M. *Azout:* And perhaps one may wait a long Day before he ſhall ſee ſuch a long laſting *Light* in the *Iceland Seas*, as was remarked by *Biornonius:* So that I cannot wonder if expert *Chymiſts* do, by ſome *Chance*, obtain more than by *Art*, and much *Diligence*, they can repeat again; ſince they deal with ſuch fickle Agents as *Fire* and *Flame*. I have heard of ſome *Dews* on Meadows, *ſhining* in the early Morning, before Day-light; but thoſe more frequently: Theſe, and much better, ſome of Mr. *Boyle*'s Inſtances in his *Pneumatical Experiments*, and more in his Diſcourſe of *Luminous Gems*, at the End of his elaborate Treatiſe of *Colours*, may, at leaſt, by Reſemblances, inſtruct us to apprehend the Nature of ſome *ſhining Meteors* among the *Clouds*, or in our *lower Region*, of which, they ſay, ſome have a *ſingeing Heat*, and do *blaſt*; and that ſome are to the Touch *gelid*, yet do *poiſon*, or *corrupt* our *Fleſh*.

Vid. *Vol.* II. *Chap.* VI. *Sect.* LXIII.

Vid. ſup. *Chap.* III. *Sect.* XXVI.

Ep. 37.

7. I ſhall only add, that I gave full Warning to obſerve whether the *Light*, in my two Inſtances, had any *blueiſh* or *greeniſh Tincture:* All that ſaw both affirmed the *Light* to be as clear as the brighteſt *Moon-ſhine*, and ſo it appeared to my own Eyes; and I can perfectly remember, that I really thought the Beams which came from the *Mackrel*, and the ſtirred Pickle, to be bright *Moon-ſhine*, till a Servant brought me to the *Veſſel*, to ſee the contrary.

Poſtſcript. We had a Report (whether true or falſe you may beſt know) of *ſhining Beef* in the *Strand*, about the ſame Time when the *Neck* of *Veal*, firſt mentioned, ſhined here: And it was here obſerved, that the *Stars* had a glaring Brightneſs, and Largeneſs, more than ordinary; and for ſome *Months* before, and ever ſince, the *Weather* hath been more gentle, warm, and dry, than is uſual in theſe *Months*; but it is above my Skill to demonſtrate how this belongs to the Matter in Hand. *Note*, That the *Mackrel-pickle* was thick, and not tranſparent, till it was ſtirred, and *flaming*; the *Pork-pickle* was clear, or tranſparent, yet *ſhined* not in any Part.

Obſervations about the Reſemblances and Differences between a burning Coal *and* ſhining Wood; *by Mr.* Robert Boyle. *n.* 32. *p.* 605.

VII. The Things wherein I obſerved a Piece of *ſhining Wood* and a *burning Coal* to agree or *reſemble* each other, are principally theſe *five:*

Reſemblances.

1. Both of them are *Luminaries*, that is, give *Light*, as having it (if I may ſo ſpeak) *reſiding in them*; and not like *Looking-glaſſes*, or *white Bodies*, which are conſpicuous only by the *incident Beams* of the *Sun*, or ſome other *luminous* Body, which they *reflect*.

This is evident; becauſe both *ſhining Wood* and a *burning Coal* ſhine the more vividly, by how much the Place wherein they are put is made the *darker*, by the careful Excluſion of the *adventitious Light*.

2. Both *ſhining Wood* and a *burning Coal* need the Preſence of the *Air* (and that too of ſuch a *Denſity*) to make them continue *ſhining*.

Vid. *Vol.* II. *Sect.* LXXVI.

This has been proved as to a *Coal*, by what I long ſince publiſhed in my *Phyſico-Mechanical Experiments*; and as to the *ſhining Wood*, the Experiments I have lately ſent you, make it needleſs for me to add any other Proof of the Requiſiteneſs, not only of *Air*, but of *Air of ſuch a Thickneſs* to make its *Light* continue.

3. Both *ſhining Wood* and a *burning Coal*, having been deprived, for a Time, of their *Light*, by the withdrawing of the contiguous *Air*, may preſently recover it by letting in freſh *Air* upon them.

The *former* Part of this, particular Trials have often ſhewn you to be true, when *kindled Coals*, that ſeem to be *extinguiſhed* in our *exhauſted Receivers*, were preſently *revived*, when the *Air* was reſtored to them; and the latter Part is abundantly manifeſt, by the *Experiments* above-mentioned.

4. Both a *quick Coal* and *ſhining Wood* will be eaſily quenched by *Water*, and *many other Liquors*.

The Truth of this, as to *Coals*, is too obvious to need a Proof; and therefore I ſhall confirm it only as to *Wood:* For which Purpoſe you may be pleaſed to take the following Tranſcript of ſome of my *Notes* about *Light*.

I took a Piece of *ſhining Wood*, and, having wetted it with a little common *Water* in a clear Glaſs, it preſently loſt all its *Light*.

The like Experiment I tried with ſtrong *Spirit* of *Salt*, and alſo with a weak *Spirit* of *Sal Ammoniac*; but in both the *Light* did, upon the *Wood's* imbibing of the *Liquor*, preſently *diſappear*.

I made the like Trial with *rectified Oil* of *Turpentine*, with a not unlike Succeſs. The ſame Experiment I tried, more than once, with high *rectified Spirit* of *Wine*, which did immediately deſtroy all the *Light* of the *Wood* that was immerſed in it; and, having put a little of that *Liquor*, with my Finger, upon a Part of the whole Piece of *Wood* that *ſhone* very vigorouſly, it quickly did, as it were, *quench* the *Coal* as far as the Liquor reached; nor did it in a pretty While, if at all, regain its *Luminouſneſs*.

5. As a *quick Coal* is not to be *extinguiſhed* by the Coldneſs of the *Air*, when that is greater than ordinary; ſo neither is a Piece of *ſhining Wood* to be deprived of its *Light* by the ſame Quality of the *Air*.

As much of this Obſervation as concerns the *Coal*, will be readily granted; and for Proof of the *other* Part of it this one *Trial* may ſuffice, which I ſhall now relate.

I took a ſmall Piece of *ſhining Wood*, and put it into a ſlender Glaſs Pipe, *ſealed* at one End, and open at the other, and placed this Pipe in a Glaſs Veſſel, where I cauſed to be put a ſtrongly *frigorifick* Mixture of *Ice* and *Salt*; and, having kept it there full as long as would be requiſite to *freeze* an *aqueous Body*, I afterwards took it out, and perceived not any ſenſible *Diminution* of its *Light*. But though the *Light* of *ſhining Fiſh* be uſually (as far as I have obſerved) more vigorous and durable than that of *ſhining Wood*, yet I cannot ſay that it will hold out againſt *Cold* ſo well as the other: For having ordered one of the Servants to cut off a good large Piece of a *luminous Whiting*, and bury it in *Ice* and *Salt*; when I called for it, in leſs than *Half* an *Hour* after, I found it much ſtiffened by the *Cold*, and to have no *Light*, that I could diſcern in a Place *dark* enough: And for fear that this Effect may have proceeded not barely from the Operation of the *Cold*, but alſo from that of the *Salt*, I cauſed, another Time, a Piece of *Whiting* to be put in a Pipe of Glaſs *ſealed* at one End, and, having ſeen it *ſhine* there, I looked upon it again, after it had ſtayed but a *Quarter* of an *Hour*, by my Eſtimate, in a *frigorifick* Mixture, which the Glaſs kept from touching the *Fiſh*; and yet I could not perceive, in a *dark* Place, that it retained any *Light*.

Differences.

1. The firſt *Difference* I obſerved betwixt a *live Coal* and a *ſhining Wood* is, that whereas the *Light* of the *former* is readily *extinguiſhable* by *Compreſſion* (as is obvious in the Practice of ſuddenly *extinguiſhing* a Piece of *Coal* by treading upon it), I could not find that ſuch a *Compreſſion* as I could conveniently give without loſing Sight of its Operation, would *put out*, or much injure the *Light*, even of ſmall Fragments of *ſhining Wood*; one of my *Trials* about which I find thus ſet down:

I took a Piece of *ſhining Wood*, and, having preſſed it between two Pieces of clear Glaſs (whereof the one was pretty flat, and the other convex), ſo that I could clearly ſee the *Wood* through the Glaſs, I could not perceive, that the *Compreſſion*, though it ſometimes broke the *Wood* into ſeveral Fragments, did either *deſtroy*, or conſiderably alter the *Light*.

2. The next *Unlikeneſs* to be taken Notice of betwixt *rotten Wood* and a *kindled Coal* is, that the latter will, in very few *Minutes*, be totally *extinguiſhed* by the withdrawing of the *Air*; whereas a Piece of *ſhining Wood*, being eclipſed by the Abſence of the *Air*, and kept ſo for a Time, will immediately *recover* its *Light*, if the *Air* be let in upon it again within *Half* an *Hour* after it was firſt withdrawn.

The *former* Part of this Obſervation is eaſily proved by the Experiments that have been often made upon *quick Coals* in the *pneumatical Engine*; and the Truth of the *latter* Part appears, by the Experiments about *ſhining Wood* mentioned above: Neither is it improbable, that, if I had had Conveniency to try it, I ſhould have found, that a Piece of *ſhining Wood*, deprived of its *Light* by the Removal of the ambient *Air*, would retain a Diſpoſition to recover it upon the Return of the *Air*, not only for *Half* an *Hour*, but for *Half* a *Day*, and perhaps a longer Time.

3. The next *Difference* to be mentioned is, that a *live Coal*, being put into a ſmall cloſe Glaſs, will not continue to *burn* for very many *Minutes*; but a Piece of *ſhining Wood* will continue to *ſhine* for ſome whole *Days*.

The *firſt* Part of the Aſſertion, I know, you will readily grant; the other Part of it may be eaſily made out by what I have tried upon *ſhining Wood*, ſealed up *hermetically* in very ſmall Glaſſes, where the *Wood* did for ſeveral *Days* retain its *Light*.

4. A *fourth Difference* may be this; that whereas a *Coal*, as it *burns*, ſends forth Store of *Smoke* or *Exhalations*, *luminous Wood* does not ſo.

5. A *fifth*, flowing from the former, is, that whereas a *Coal* in *ſhining* waſtes itſelf at a great Rate, *ſhining Wood* does not.

Theſe *two Unlikeneſſes* I mention together, becauſe what concerns the *Coal* in both will need no Proof; and as for what concerns *rotten Wood*, it may be verified by an Obſervation that I made in a Piece of it *hermetically ſealed* up in a ſmall clear Glaſs; where, after it had continued *luminous* ſome Days, I looked on it in the *Day-time* to perceive if any Store of *Spirits* or other *Steams* had, during all that While, *exhaled* from the *Wood*; but could not find any on the Inſide of the Glaſs, ſave that in one Place there appeared a kind of *Dew*, conſiſting of ſuch very ſmall Drops that a Multitude of them would go to the making up of one ordinary Drop. But in Pieces of *ſhining Fiſh* I found the Caſe much otherwiſe, as was to be expected.

6. The *laſt Difference* I ſhall take Notice of betwixt the Bodies hitherto compared is, that a *quick Coal* is actually and vehemently *hot*; whereas I have not obſerved *ſhining Wood* to be ſo much as ſenſibly *luke-warm*.

What is ſaid of the *Coal's Heat*, being as manifeſt as its *Light*, I ſhall need only to make out what relates to the *ſhining Wood*; to aſſiſt me wherein, I meet, among my *Notes*, this following:

: I put upon a large Piece of *Wood*, which was partly *ſhining*, and, as near as I could, upon one of the moſt *luminous* Parts of it, one of thoſe *Thermoſcopes* that I make with a *pendulous Drop* of *Water*; but as I had formerly tried that by laying the Tip of my Noſe or Finger upon it, when it *ſhone* vividly enough to enable me to *diſcern* both the one and the other at the Time of a *Contact*, I could not perceive the leaſt Degree of *Heat*, but rather an *actual Coldneſs*; ſo by this Trial I could not ſatisfy myſelf that it did viſibly raiſe the pendulous Drop, though the Inſtrument was ſo tender, that, by approaching one Finger near it, yet, without actually touching it, it would manifeſtly be impelled up; and, upon the removal of my Finger, would preſently deſcend again.

And I remember, that, having put ſuch an *Inſtrument* upon a *ſhining Fiſh*, that was pretty large, I could not thereby perceive that it had any Degree of *Heat*, but rather the contrary: For having divers times taken off the Glaſs, to apply it with the more Advantage to ſeveral Parts of the *luminous Fiſh*, I divers times took Notice, that, upon the removal of the Glaſs into the *Air*, the *pendulous Drop* would manifeſtly riſe a little, and ſubſide again when the Glaſs was applied to the *Fiſh*. But whether this Part of the Experiment will hold in all Temperatures of the *Air*, I had not Opportunity to try.

VIII. The *Great Pier* is quite demoliſhed, and filled up with *Rubbiſh*, and the *Rocks* that lay about forty *Yards* off in the *Sea* at the *Pier-head* are riſen above Water; ſo that there are no Hopes of making good that *Pier* again. And the *Ways* leading from that *Pier* to the *Quarry* are turned upſide-down, and ſunk, at ſeveral Places, about thirty *Foot*: Alſo, the *Way* leading to the *North Pier* is under the ſame Circumſtances, and the *Pier* cracked in ſeveral Places; which *Pier*, with ſome Charge, may be repaired. The Earth is ſlid into the Sea, between the two *Piers*, near an hundred *Yards*, and is yet working off into the *Sea*, whereby the Iſland is damnified ſeveral *Thouſand Pounds*, beſides the Number of poor People that depend upon their daily Labour in the *Quarry*; the Work ceaſing till Reparation be made, and continues yet dreadful to behold: Which, as is conjectured, proceeded from a great Quantity of *Rubbiſh* thrown over the *Cliff* upon a *clayiſh Foundation*, that, by the Violence of Rain, was made ſoft, and gave way; and not by an *Earthquake*, as ſome report.

An Account of Damage *that happened at* Portland, Feb. 2. 1695-6. *communicated by Sir* Rob. Southwell. *n.* 231. *p.* 659.

April 29. 1696. I found *another* Sort of *Creatures* in the *Water* (ſome of which I had kept in a Window, in an open Glaſs); they were as large as *three* of the other with the *green* Border about their Middles; but theſe were perfectly clear and colourleſs.

Then alſo examining more accurately the *Belts* or *Girdles* of *Green* that were about the *Animals* mentioned above, I found them to be compoſed of *Globules*, ſo like the *Rowes* or *Spawn* of *Fiſhes*, that I could not but fanſy they ſerved for the ſame Uſe in theſe little *Creatures:* For I found now, ſince *April* 27. many of them without any thing at all of that *green Belt*, or *Girdle*; others with it very much, and that unequally, diminiſhed, and the Water filled with a vaſt Number of *ſmall Animals*, which before I ſaw not there, and which I now looked on as the young *animated Fry*, which the old ones had ſhed. I continued looking on them, at times, for *two Days*; during which time the Number of the old ones, with the *green Girdles*, decreaſed more and more; and at laſt I could not ſee one of them ſo incompaſſed, but they were all *clear* and *colourleſs* from End to End.

May 18. 1696. I looked on ſome of the Surface of *Puddle-water*, which was *blueiſh*, or rather of a *changeable Colour* between *Blue* and *Red*; in a very ſmall Drop of which I found prodigious Numbers of *Animals*, and of various Bigneſſes; but among thoſe were none with thoſe *Girdles* before-mentioned, either of *Green*, or any other *Colour*.

I then alſo examined the Surface of ſome other *Puddle-water*, that looked a little *greeniſh*; and this I found ſtocked with ſuch infinite Numbers of *Animals*, that I never ſaw the like any-where but in the *Genitura Maſculina* of ſome Creatures. Among theſe there were very many of a *greeniſh* Colour, but they all moved about ſo ſtrangely ſwift, and were ſo near to each other, that though I tired my Eyes, I could not diſtinguiſh whether the *green* Colour were all over their Bodies, or whether it were only round their Middles in *Girdles*, as before: But from the Roundneſs of their Figure, and their Smalneſs, I judge, that they chiefly conſiſted of the young *animated Spawn* of that kind of *Animals* I mentioned above. I found, that the Point of a Pin, dipped in *Spittle*, would preſently *kill* them all; as I ſuppoſe it will other *Animalculæ* of this kind.

The ſame Day, alſo, I looked on the Surface of ſome *Mineral (Chalybeate)* Water, which had ſtood in a Phial unſtopped for about *three Weeks:* In it I ſaw two *Kinds* of *Animals*, *one* exceeding ſmall, and the *other* very large; which *latter* Sort had on the *Tail* ſomething that looked like *Fins*. There were but very few of either Sort.

The *compounded Salt*, or *Vitriol*, of the Water, was *ſhot* into pretty Figures, but all irregular: They looked all like a ſmall Heap of little *Sticks*, laid acroſs each other at all Angles and Poſitions; only they were tranſparent, and a little *greeniſh*, as *Cryſtals* of a *Chalybeate* Nature uſe to be.

I infuſed whole *Pepper-corns*, *Bay-berries*, *Oats*, *Barley*, and *Wheat*, in *Water*; whoſe *Scum*, after 2 or 3 *Days*, afforded *Animals*, as hath been often already found by others, at leaſt as to ſome of them; but I found the greateſt

Numbers and Variety in *Wheat* and *Barley-water*, and the feweſt in that wherein *Bay-berries* had been ſteeped.

How ſuch vaſt Numbers of *Animals* can be thus (as it were at Pleaſure) produced, without having recourſe to *equivocal Generation*, ſeems a very great Difficulty to account for. But though the *ſolving* of it that way makes ſhort Work of the Matter (for it is eaſy enough to ſay they are bred there by *Putrefaction*), yet the aſſerting *equivocal Generation* ſeems to me to imply more Abſurdities and Difficulties than perhaps may appear at firſt Sight: I wiſh, therefore, that this Matter would a While employ the Thoughts of ſome ingenious and inquiſitive Man. In the mean Time I have conjectured, that theſe *Animalculæ* may be *produced* by one or both of the following Ways:

1. I have thought that the *Eggs* of ſome exceeding ſmall *Inſects*, which are very numerous, may have been laid or lodged in the *Plicæ* or *Rugæ* of the *Coats* of the *Grain*, by ſome Kinds that inhabit on thoſe *Seeds*, as their proper Places; for that *Inſects*, of the larger Kind, do frequently thus depoſit their *Eggs* on the *Flowers* and *Leaves* of *Plants*, is often experimented; and it is very probable that the ſmaller, or *microſcopical Inſects*, do the ſame. Now theſe being waſhed out of the *Seeds*, by their Immerſion in Water, may riſe to the Surface, and there be *hatched* into thoſe *Animals* which we ſee ſo plentifully to abound there.

2. Or the Surface of the Water may arreſt the ſtraggling *Eggs* of ſome *microſcopical Inſects*, that perhaps were about in the *Air*; and, being fitted and prepared for this Purpoſe, by the Infuſion of proper *Grain*, or a proportionable Degree of *Heat*, may compoſe ſo proper a *Nidus* for them, that they may, by the Warmth of the *Sun*, be eaſily hatched into *living Creatures*; which, it is probable (like the ſtrange *Water-inſect* from whence a *Gnat* is produced, mentioned by the learned Dr. *Hook* in his *Micrographia*, whoſe *Metamorphoſis* I have often with Pleaſure ſeen), may afterwards turn into *Flies*, or *winged Inſects*, of the ſame *Species* with the *Animal Parent*. And perhaps ſometimes both theſe Circumſtances, and others of the like Nature, concur for their *Production*.

Microſcopical Animals; *by Mr.* S. Gray. *n.* 221. *p.* 283. Vid. *Vol* I. *Chap.* III. *Sect.* XXIV.

XIII. I have obſerved in *Hemiſpherules* of *Water*, duly applied to the *End* of a *Wire*, two Sorts of *microſcopical Inſects*, *globular* and *elliptical*. Thoſe of a *globular* Form are but a little leſs tranſparent than the *Water* they ſwim in; they have ſometimes two *dark Spots* diametrically oppoſite, but theſe are rarely ſeen: There are ſometimes two of theſe *globular Inſects* ſticking together; where they are joined it is opacous; poſſibly they may be in the Act of *Generation*. They have a twofold Motion, a ſwift *progreſſive* irregular one, and, at the ſame time, a *Rotation* on their Axes at Right Angles to the Diameter that has the *dark Spots*; but this is ſeen only when they move ſlowly. They are almoſt of an incredible *Minuteneſs*.

I have examined many *tranſparent* Fluids, as *Water*, *Wine*, *Brandy*, *Vinegar*, *Beer*, *Spittle*, *Urine*, &c. and do not remember to have found any of them without more or leſs of the Bodies of theſe *Inſects*; but I have not ſeen any Motion, except in *common Water* that has ſtood for ſometimes a longer, at others a ſhorter time, as has been obſerved by M. *Lewenhoeck*; though I do not remember he has obſerved that they are exiſtent in the *Water* before they revive. In the *River*, after the *Water* has been thickened by *Rain*, there are ſuch infinite Numbers of them, that the *Water* ſeems, in great part, to owe *Opacity* and *Whiteneſs* to theſe *Globules*. *Rain-water*, ſo ſoon as it falls, has many, and *Snow-water* has more of theſe *Globules*. The *Dew* that ſtands on Glaſs-windows has them; and for as much as *Rains* and *Dews* are continually aſcending or deſcending, I believe we may ſay, the *Air* is full of them: They ſeem to be of the ſame *ſpecifick Gravity* with the *Water* they ſwim in, the *Dead* remaining in all Parts of the *Water*. Of many *Thouſands*, that I have ſeen, I could diſcern no ſenſible Difference in their Diameters, they appearing of equal Bigneſs. In *Water* that has been *boiled* they retain their *Shapes*, and will ſometimes *revive*.

There is another Sort of *Inſects* I have this way ſeen, but theſe are not ſo frequently (at leaſt this Winter Seaſon) to be found: They are much longer than the former; they can transform themſelves into many Shapes; they are, for the moſt part, *elliptical*, but ſometimes they contract themſelves ſo as to be almoſt *globular*; and ſometimes they extend themſelves ſo, as to be twice or three times longer than broad: Theſe ſometimes turn themſelves *round* on their Axes and Diameters as they go; they conſiſt of *tranſparent* and *opacous* Parts.

Obſervations on the Animalculæ *in* Pepper-water, *&c. by Sir* Edm. King. *n.* 203. *p.* 861. *Fig.* 78.

XIV. Having ſteeped *Oats* in *Rain-water* ſome *Days* (perhaps nine or ten), and looking upon it with my bare Eye, I ſaw a Subſtance that ſeemed to me like that uſually called a *Mother* (on other Liquors); and laying as much of it as a ſmall Pin's Head upon the *Object-plate* of my beſt *Microſcope*, I could very eaſily and plainly diſcern ſeven or eight Sorts of *Animalculæ*, of different *Sizes* and *Shapes* (or more), ſwimming in this Subſtance. Their Shapes and Sizes were after this Manner, as near as I could gueſs. They were all very *nimble* in their Motions, by Computation, ſeveral *thouſand* times *magnified*.

2. The thin Scum upon *Pepper-water*, that did reſemble *Flakes* of *Salt* upon ſome Sorts of human *Urine*, applied in the ſame Manner to the *Object-plate* of the *Microſcope*, were only Cluſters of *Animalculæ*, that had liquid Matter enough to ſwim in; and I was in Admiration at their Numbers, Motions, Variety, and Minuteneſs.

3. In a Decoction of *Herbs*, that was ſtrained, and ſet by for a particular Uſe; in a little of the Settling of that (as much as a Pin's Head) I ſaw Creatures like little *Eels*, about *thus long*, and ſeemed to be as thick, but much ſharper at both Ends, with a wriggling Motion, like *Eels*.

Fig. 79.

4. I obſerve theſe ſmall Creatures above-mentioned (if I may ſo call them) reſemble the Nature of *Fiſh* in ſeveral reſpects.

Firſt, They will flock together, and lie cloſe together, as if they were in *Shoals*, like *Carps* in a *Pond*, that has been ſo ſhallow, as I have often ſeen, ſometimes in one Place, ſometimes in another; but, when diſturbed, they are, as to your Sight, all diſperſed and loſt in a Trice: And ſo are theſe little Creatures in their original Liquor, if you ſhake the Liquor before you look to find them in *Sholes*, or after; at leaſt I am ſure I did, and could never find any in that Parcel of Liquor till next Day, or till they did *aſſociate* again.

2*dly*, They will follow their Liquor, to act in, to the laſt Particle of it, till they have no more to *ſwim* in; and then will ſeem to ſtruggle for want on't, till their Strength fails them; and then, after a *Minute*, they will ſeem *dead* upon the *Object-plate* (when the watry Parts are dried away).

3*dly*, They will lie as if they were *dead* near *Half* an *Hour*, or more; then put a little *Water* to them, in *Half* a *Minute* they will begin to move themſelves again, and, by Degrees, begin to *ſwim* faintly and feebly at firſt (as *Fiſh* will do); then, recovering their *Strength* again, will perform their briſk Motions as vigorous as ever.

4*thly*, Thoſe that are almoſt dead will look *flat*, as if preſſed then; but, when they move, turn themſelves over and over, without any regular Motion; ſo that you might ſee them as *thin* as the thinneſt Spangle you ever ſaw, and like it in Shape; and they will continue ſo, ſo long as they are faint and ſick; but within about an *Hour*'s time they will grow plump and well again, if you add freſh Liquor to them in time.

Theſe *Animalculæ* chooſe, for the moſt part, the Top of the Liquor; I ſuppoſe for the Sake of the *Air*.

If you perceive them lie *dead* upon the *Object-plate*, as I did, and do not remember to add *Water* to revive them within an *Hour*, they will be dead indeed; but you may ſee them, in the *Poſture* you left them, many *Days* after.

Now to give a farther Teſtimony that they are *Animalculæ*, which ſome doubt, I have noted the following Obſervations:

If you take a fine Needle, and put the Point in the *Spirit* of *Vitriol*, tho' you can ſee none of the *Spirit* with your *bare Eye* upon its Point when you take it out; yet, if you prick the ſame Point of that *Needle* into the Middle of that *Drop*, no bigger than a ſmall Pin's Head, when ſome *Hundreds* of theſe *Animalculæ* are *ſwimming* very nimbly friſking about, you ſhall immediately ſee theſe *minute Creatures* (if I may ſo call them) preſently affected from the *acid* Particles, ſo as to *ſpread* themſelves, and tumble down ſeemingly *dead*. *Fig.* 80.

If you diſſolve *Salt*, and with the Point of the ſame Needle repeat the Experiment (in the ſame manner) in ſome of the ſame Liquor that contains ſome of the ſame Parcel of *Animalculæ*; you ſhall ſee the *Creatures*, afore-mentioned, be affected too, ſtop in their Motions, but in another manner quite; not ſpread flat, as thoſe with *Spirit* of *Vitriol* did, but ſhrink long and round, in Form and Figure of that we call (whole *Oatmeal*, or) an *excorticated Oat*. And whereas the firſt with the *Spirit* fell down flat, without turning; theſe, as ſoon as affected, turn round and round, when they begin to be ſick, and wobble, as we ſay, before they fall down to the Bottom and *die*, unleſs you quickly recover them with freſh Water, and then you will perceive them get a new Life, by Degrees.

Tincture of *Salt* of *Tartar* put into them, in the ſame Manner, *kills* them more immediately; but yet they will be firſt ſo *ſick*, or ſo affected, call it what you pleaſe, as you may ſee, by a ſurpriſing *convulſive* Motion, they will grow faint and languid apace; as you may ſee them fall to the Bottom of the *Drop*, upon your Object-plate, *dead*, but in their own *Shape*, as they were before you applied your Needle; and will neither be *flat*, as with *Spirit* of *Vitriol*; nor *cylindrical*, as with *common Salt* Liquor.

Ink kills them as ſoon as *Spirit* of *Vitriol*, but makes them ſeem to ſhrink divers Ways, I ſuppoſe by the *Solution* of *Copper* which is in its Compoſition.

Blood (newly preſſed from a Prick purpoſely made in your Finger) *kills* them almoſt as ſoon as *Spirit* of *Vitriol*, by reaſon (I ſuppoſe) of the *Salt* therein; but it is a fine and ſurpriſing Sight to obſerve them *ſwimming* and buſtling, firſt among the *Globules* of the *Blood*, juſtling one another like *Fiſh* that are ſuddenly deprived of *Water*, and buſtle together amongſt *Mud*; for ſo they appeared to me.

Urine kills them too, in a little Time, though not ſo ſoon.

Sugar diſſolved like *Salt* kills them alſo, if uſed in the ſame Manner; and with that ſome die *flat*, and ſome die *round*.

Sack will kill them, but not ſo ſpeedily as the other Liquors.

Miſcellaneous Experiments; by Sir Rob. Southwell. *n.* 238. *p.* 87.

XV. For *Red*, *Tinctura Roſarum*, 6 Spoonfuls.

For a *higher Red*, *Syrupus Florum Punicorum*, one Spoonful; either of theſe to be mixed with 5 of ordinary *Water*.

For *Violet*, one Spoonful of *Syrup* of *Violets* to 5 Spoonfuls of *Water*.

Then to *change* the *Roſe Colour* into *high Green*, take *Oleum Tartari per deliquium*; waſh herewith the Inſide of the Glaſs, leaving a few Drops at the Bottom, and then pour in the ſaid *Roſe Tincture*, and it will change.

To make the *high Red Black*, diſſolve half the Bigneſs of a *Walnut* of *Sal Ammoniac* in a Glaſs of Water; pour all out but 3 or 4 Drops in the Bottom; if the ſaid *Red* be put hereinto, it turns as *black* as *Ink*.

To make the *Violet Red*, waſh the Glaſs with the *Spirit* of *Vitriol* in manner aforeſaid, and pour therein your *Violet Water*.

To make *Red Wine yellow* as *Sack*, ſteep in *White Wine Braſil Wood* 24 *Hours*, or elſe in ordinary Water, till it looketh *red*, and pour the ſame into a Glaſs waſhed with *Vinegar*; it grows preſently *yellow*.

To make this *Yellow white*, take *Styrax Calamita* and *Benjamin*, *Half* an *Ounce* of each; pulverize it, and ſteep it in 4 *Ounces* of *Aqua Vitæ*, of which a few Drops will turn the Liquor *white*.

Note, This maketh the *Lac Virginis* for the common *Waſh*.

Waſhing with *clear Water*, to make the Hands and Face *black*.

Beat *Galls* into a very fine Powder, and ſtrew it very well, and roll it up and down into a *Towel*, then into a *Baſon* of *Water* throw ſome *Roman*

Vitriol, which will ſoon diſſolve; and after the Party hath waſhed therein, it being *clear*, and without Smell, as ſoon as they wipe with the Towel, all the *Skin* grows *black*; and in ſome Days, waſhing it with *Soap*, it will come off.

To renew the *Luſtre* of *Cryſtal*, boil your Cryſtal in fair Water for a *Quarter* of an *Hour*, and to a Proportion of ſix *Quarts* of Water add one *Quart* of *Brandy Wine*, letting the ſame continue to boil *Half* an *Hour* more; then take it out, and with the ſame Liquor rub it all over throughout with a Bruſh; and then dry it with a clean warm Napkin, rubbing it in every Part, and it will regain its former *Luſtre*.

To make the *Hair* grow, take the *Roots* of *Burdock*, or what they call *Cuckolds-burs*, which ſtick on the Cloaths, of the largeſt Size, in *December*; boil them in *French White Wine* 8 Fingers high, till Half be conſumed: Waſh the *Head* therewith, being warmed, at Night; and it makes the *Hair* come out, in caſe the *Roots* be good.

Another. Make a *Lye* of the *Aſhes* of *Vines*, and waſh the Head therewith, being warm.

To hinder the *Hairs* from *falling*, put *Vine-aſhes* in *Red Wine* of *France*, and then filtre all, and with that Liquor waſh the *Head* warm.

Memorandum. The Powder of *Hermodactiles* uſed in the *Hair*, as common *Powder*, does the ſame Thing.

Pour faire du *Feu Bleu*; faites vous faire de *Meſches* aupres d'un *Cordier*, qui ne ſoit pas trop fortement Tordues. Fondez du *Soulfre* dans un pot à *Feu* de *Charbons*, trempez les *Meſches* dedans Trois ou Quatre fois ſelon que vous les aimerez d'avoir Groſſes. Pour en repreſenter donc une Figure, on l'ebauche ſur des Planches, puis on y attache en ſuivant ces Traces les *Meſches* avec des Cloux, & les rend un peu rabotteuſes en les battant avec un Marteau, à fin que la matiere ſuivante y tienne tant mieux. Celà fait, prenez de l'*Eau de Vie* forte, meſlez y de la *Poudre à Canon* en Farine, tant que tout ſoit en Conſiſtence d'une bouille, & frottez en les *Meſches* avec un Pinceau, & eſpardez encore deſſus de la *Poudre* en Farine. Ainſi on laiſſe le tout Secher, & il ſera Preparé à l'Uſage.

To give Iron a Copper Colour; by Sir Robert Southwell. *n.* 243. *p.* 295.

XVI. Take of ſmall thin *Copper* Pieces, cleaned in the Fire, 1 Ounce; of *Aqua Fortis*, 3 Ounces; which being put together in a Glaſs, the *Copper* in 3 or 4 Hours will be diſſolved: When it is cold, you may uſe it, by waſhing with a Feather upon your *Iron*, that is made clean and ſmooth, and it will preſently take the Colour of *Copper*. When it cometh out with rubbing, you may renew it again; but if you do it *twice* together, the *Iron* will look *black*.

To gild Gold upon Silver; by Sir Robert Southwell. *n.* 243. *p.* 296.

XVII. Beat a *Ducket* thin, and diſſolve it in two *Ounces* of *Aqua Regia*, then dip therein a clean *Rag*, and let the ſame dry, and do it again and again, till all the ſaid Liquor be ſoaked up; then burn the ſaid Rag, and with the Tinder thereof let *Silver* be rubbed, uſing therewith a little Spittle, and if by chance the *Silver* will not take, then hold it to the Fire, to take away all manner of Greaſe, and it will not fail.

Memorandum. This Method is known to very few *Goldſmiths* in *Germany.*

To print Glaſs in marble Colours; by Sir Rob. Southwell. *n.*245.*p.*364.

XVIII. 1. Grind well upon a *Stone* ſome *Minium*, for *Red.*
2. *Radix Curcumæ*, or rather *Ceruſſa Citrina*, for *Yellow.*
3. *Smalt*, for *Blue.*
4. *Verdegris*, for *Green.*
5. *Ceruſs*, or *Chalk*, for *White.*

Which being all ſeparately wrought in *Oil*, take a Bruſh of Hogs Hair, dipped in any of the ſaid *Colours*, and it will, being rolled in your Hand, ſcatter the ſame upon the Glaſs; then, with your *Pencil*, work them together, as you think fit; and, laſtly, fling a little *Mead* amongſt them, which covers all.

An Imitation of China Diſhes; *by*... *n.*7.*p.*127.

XIX. S. *Septalio*, a Canon of *Milan*, hath the Secret of making as good *Porcelane* as is made in *China* itſelf, and *tranſparent.*

The Chineſe *Way of making* Gold-thread; *by Dr.* Hans Sloane. *n.*250.*p.*71.

XX. The *Chineſe* gild Paper on one Side with *Leaf Gold*, then cut it in long Pieces; they then *weave* it into their *Silks*, which makes them, with little or no Coſt, look very rich and fine. The ſame long Pieces are twiſted or turned about *Silk Thread* by them, ſo artificially, as to look finer than *Gold Thread*, though it be of no great Value.

To counterfeit Opal; *by Mr.* S. Colepreſſe. *n.*38.*p.*743.

XXI. I have been two Days at *Harlem*, on purpoſe to ſee the Experiment of the making of *counterfeited Opal-glaſs:* It is very lively, I confeſs, and, as I gueſs, performed only by the *Degrees* of *Heat*, producing the *Colours.* When the Compoſition is thoroughly melted, they take out ſome on the Point of an *Iron Rod*, which being cooled, either in the *Air* or *Water*, is colourleſs and pellucid; but being put into the *Mouth* of the *Furnace*, on the ſame Rod, and there turned by the Hand for a little Space, hath its little Bodies ſo variouſly poſited in ſeveral Parts of the ſame Piece, as that the Light falling on them, being variouſly *modified* thereby, repreſents thoſe ſeveral Colours that are ſeen in the true *Opal.* Whether it be the greateſt or leaſt Degree of *Heat*, that renders it a *white opake* Body, I have let ſlip; but this I know (which ſeems remarkable), that the *Colours* of it may be deſtroyed and reſtored, according to the various Motions (I ſuppoſe) of its Particles by *Heat.*

Some Obſervations touching Colours *and* Dyes; *by Dr.* M. Liſter. *n.*70.*p.*2132.

XXII. Two Things, I conceive, are chiefly aimed at in the Inquiry of *Colours*; the *one*, to increaſe the *Materia Tinctoria*; and the *other*, to fix, if poſſible, thoſe *Colours* we either have already, or ſhall hereafter diſcover, for Uſe. As to the *firſt*, *Animals* and *Vegetables*, beſides other natural Bodies, may abundantly furniſh us; and in both theſe Kinds ſome *Colours* are *apparent*, as the various Colours of *Flowers*, and the Juices of *Fruits*, &

&c. and the *Sanies* of *Animals*; others are *latent*, and diſcovered to us by the Effects the ſeveral Families of *Salt*, and other Things, may have upon them. Concerning the *apparent Colours* of *Vegetables* and *Animals*, and the various Effects of different *Salts* in changing them from one Colour to another, we may have many Inſtances in Mr. *Boyle*: And if we might, with the good Leave of that honourable and learned Perſon, range them after our Faſhion, we ſhould give you, at leaſt, a new Proſpect of them, and obſerve to you the Conformity and Agreement of the Effects of *Salt* on the divers Parts of *Vegetables*; viz.

1. That *acid Salts* advance the *Colours* of *Flowers* and *Berries*; that is, according to the Experiments of Mr. *Boyle*, they make the *Infuſions* of *Balauſtium* or *Pomegranate-flowers*, *Red-roſes*, *Clove-jilly-flowers*, *Meſerion*, *Peas-bloom*, *Violets*, *Cyanus-flowers*, of a *fairer Red*; alſo the *Juices* of the *Berries* of *Liguſtrum*, of *Black Cherries*, *Buck-thorn-berries*, of a much *fairer Red*: And, to the ſame Purpoſe, *acid Salts* make no great Alterations upon the *white Flowers* of *Jaſmin* and *Snow-drops*. 2. That *urinous Salts*, and *Alcalis*, on the contrary, quite alter and change the *Colours* of the ſame *Flowers* now named, and the *Juices* of the ſaid *Berries* alſo, from *red* to *green*; even *Jaſmin* and *Snow-drops*. 3. Again, that in like manner *urinous Spirits* and *Alcalis* advance, at leaſt do not quite ſpoil the *Colours* of the *Juices* of *Leaves* of *Vegetables*, of their *Wood* and *Root*. Thus Mr. *Boyle* tells us, that *urinous Spirits* and *Alcalis* make the *yellow* Infuſions of *Madder-roots*, *red*; of *Braſil-wood*, *purpliſh*; of *Lignum Nephriticum*, *blue*; the red Infuſion of *Log-wood*, *purple*; of the *Leaves* of *Sena*, *red*. 4. That, on the contrary, *acid Salts* quite alter and change the ſaid Infuſions, from *red* or *blue*, to *yellow*.

In the next Place we would note to you the Effects of *Salts* upon *Animals*, in the Production and Change of *Colours*; but the Inſtances are very few or none, that I meet with in any Author, the *Purple-fiſh* being quite out of Uſe; and *Cochineal* and *Kermes* are by moſt queſtioned whether they are *Animals*, or no; but I think we may confidently believe them both to be *Inſects*, that is, *Worms* or *Chryſalis* of reſpective *Flies in proxima fœtura*. We find, then, and have tried, concerning *Cochineal* (which of itſelf is *red*), that, upon the Affuſion of the *Oil* of *Vitriol*, that is an *acid Salt*, it ſtrikes the moſt *vivid Crimſon* that can be imagined; and with *urinous Salts* and *Alcalis* it will be again changed into an obſcure Colour betwixt a *Violet* and *Purple*.

Vide *Vol.* II. *Chap.* VI. *Sect.* LIX. & *Sect.* XI. & *Sect.* XXVIII.

Concerning the *apparent Colours* in *Flowers*, we think we may aſſert, 1. That generally all *red*, *blue*, and *white Flowers*, are immediately, upon the Affuſion of an *Alcali*, changed into a *green Colour*, and then, in Proceſs of no long time, turned *yellow*. 2. That all the Parts of *Vegetables*, which are *green*, will, in like manner, ſtrike a *Yellow* with an *Alcali*. 3. That what *Flowers* are already *yellow*, are not much changed, if at all, by an *Alcali* or *urinous Spirit*. 4. The *blue Seed-huſks* of *Glaſtum Sylveſtre*, old gathered and dry, diluted with Water, ſtain a *Blue*, which, upon the Affuſion of *Lye*, ſtrikes a *Green*; which *Green* or *Blue*, being thus touched with the *Oil of Vitriol* dyes a *Purple*. All theſe three *Colours* ſtand. 5. On the Tops of *Muſcus Tubuloſus*, ſo called by Mr. *Ray* in his late *Catalogue* of the *Plants* of *England*, are certain *red* Knots; theſe, upon the Affuſion of *Lye*, will ſtrike a *Purple*, and ſtand.

As for the *latent Colours* in *Vegetables* and *Animals*, to be diſcovered to us by the Affuſion of *Salts*, they likewiſe, no doubt, are very many. We will ſet down only a few Inſtances in both Kinds, which have not been, that we know of, diſcovered or taken notice of by others. I. *Latent Vegetable Colours*. 1. The *milky Juice* of *Lactuca Sylveſtris coſta Spinoſa*, and *Sonchus Aſper* and *Levis*, upon the Affuſion of *Lye*, will ſtrike a vivid *Flame-colour*, or *Crimſon*, and after ſome time quite degenerate into a dirty *Yellow*. 2. The *Milk* of *Cataputia Minor*, upon the Affuſion of *Lye*, eſpecially if it be drawn with a Knife, and hath any time ſtood upon the Blade of it, will ſtrike a *Purple* or *Blood-red Colour*, and by-and-by change into an ignoble *Yellow*. II. *Latent Animal Dyes*. 1. The common *Hawthorn-Caterpiller* will ſtrike a *Purple*, or *Carnation*, with *Lye*, and ſtand. 2, The Heads of *Beetles* and *Piſmires*, &c. will with *Lye* ſtrike the ſame *Carnation-colour*, and ſtand. 3. The *Amber-coloured Scolopendra* will give with a *Lye* a moſt beautiful and pleaſant *Azure* or *Amethyſtine*, and ſtand.

Laſtly, We might conſider the *fixing* of *Colours* for Uſe; but we are willing to leave this to more experienced Perſons: Some obvious Inferences, however, we may venture to take notice of. 1. That, in all the Inſtances above-mentioned, whether *Vegetable* or *Animal*, there is not one *Colour* truly *fixed*; I ſay truly *fixed*, that is, Proof of *Salt* and *Fire*: For what ſeems to ſtand, and be *Lye-proof*, are either wholly deſtroyed by a different *Salt*, or changed into a much different *Colour*; which muſt needs prove a *Stain* and Blemiſh, when it ſhall happen in the Uſe of any of them. 2. That both the *apparent* and *latent Colours* of *Vegetables* are *fixable*: An Inſtance whereof we may obſerve in the *Seed-huſks* of *Glaſtum*, and the Uſe *Dyers* make of the *Leaves*, after due Preparation. 3. It is probable, from the ſame Inſtance, that we may learn, from the *Colour* of ſome Part of the *Fruit* or *Seed*, what *Colour* the *Leaves* of any *Vegetable*, and the *whole Plant*, might be made to yield for our *Uſe*. 4. That the *latent Colours* of *Vegetables* are pre-exiſtent, and not produced; from the ſame Inſtance of *Woad*, and likewiſe from this, that the *milky Juice* of *Lactuca Sylveſtris* doth afford itſelf a *red Serum*. 5. That the *Change* of *Colours* in *Flowers* is gradual and conſtant. 6. That the *Colours* of *Flowers*, which will not ſtand with *Lye*, ſeem to be wholly deſtroyed by it, and irrecoverable. Thus it happens in the Experiment, that one Part of a *Violet Leaf*, upon the Affuſion of *Lye*, is *changed* very ſoon into *Yellow*, and will never be revived into a *Red* by any *acid Salt*; but if another Part of the ſame *Leaf* be ſtill *Green*, it will be revived. 7. That the Drineſs ſeems to be a Means, if not of *fixing*, yet bringing the *Vegetable Colour* into a Condition of not wholly and ſuddenly periſhing by the otherwiſe deſtroying *Alcali*. 8. That thoſe *Plants* or *Animals* that will ſtrike different, and yet vivid *Colours*, upon the Affuſion of *different Salts*, and ſtand, as the *Cochineal* and *Glaſtum*, are probably, of all others, to be reckoned as the beſt Materials.

The Weſt-Indian *Way of dreſſing* Buck *and* Doe-skins; *by Sir* Robert Southwell. *n.* 194. *p.* 532.

XXIII. The *Pelt* being taken off, is firſt ſtreined by Lines on a Sort of *Rack*, to dry them; and the *Brains* of the *Deer* are taken out, and meſled and daubed on Moſs or dried Graſs, and then dried in the Sun, or by a Fire, to preſerve them.

When the *hunting Time* is over, the *Women* (for the *Men* never do it) *dreſs* the *Skins*; firſt, by putting them in a Pond, or Hole of Water, to *ſoak* them well; then with an old Knife, fixed in a cleft Stick, they force off the *Hair*, whilſt they remain wet: The *Skins* being thus prepared, they put them, and a Proportion of the *dried Brains*, into a Kettle over a Fire, till they are more than *Blood-warm*; which will make them *lather* and ſcour perfectly clean; which done, they with ſmall Sticks wreſt and twiſt each *Skin* as long as they find any *Wet* to drop from them, letting them remain, ſo wreſted, ſome *Hours*; and then they untwiſt each *Skin*, and put them into a Sort of a *Rack*, like a *Clothier*'s *Rack* (which they fix at every Place they come to, with no more Trouble than two ſmall Poles ſet upright, and two more put athwart, all fixed with their own *Barks*), and extend them every Way by Lines; and as the *Skin* dries, ſo they, with a dull *Hatchet*, or a *Stick* flatted and brought to a round Edge, or a *Stone* fitted by Nature for that Purpoſe, rub them all over, to force all the Water and *Greaſe* out of them, till they become perfectly *dry*. This is all they do: And one *Woman* will *dreſs* eight or ten *Skins* in a *Day*; that is, begin and end them. . . . .

The Strength of Memory; *by Dr.* Wallis. *n.* 178. *p.* 1269.

XXIV. It is a conſiderable Advantage which thoſe have who want their *Eye-ſight*, as to *Memory*, and the Application thereof: For we who have our *Eye-ſight* can with more Advantage apply our *Memory* (in Matters of intent Conſideration) by *Night*, in the *Dark*, when all Things are quiet, than by *Day*, when *Sights* and Noiſe are apt to divert our Thoughts; and even by *Day* we may better do it with our *Eyes ſhut*, than *open*.

I had the Curioſity, many *Years* ago, to try how far the *Strength* of *Memory* would ſuffice me to perform ſome *arithmetical* Operations (as *Multiplication*, *Diviſion*, *Extraction* of *Roots*, &c.) without the Aſſiſtance of *Pen* and *Ink*, or ought equivalent thereto; and I found it to ſucceed in Numbers of 20, 30, or 40 *Places*. Particularly, *December* 22. 1669. (by *Night*, in the *Dark*) I extracted the *Square Root* of 3, to the 20th *Place* of *decimal Fractions*; and, at the Requeſt of a *Foreigner*, *Feb.* 18. 1670-1. (by *Night*, in *Bed*, and without any other Aſſiſtance than my *Memory*) I propoſed to myſelf a Number of 53 *Places*, and found its *Square Root* to 27 *Places*; and (having fixed them in my *Memory*, by repeating the ſame Operation a Night or two after) at his next Viſit, *March* 11. following, I dictated to him the *Numbers* from my *Memory*, not having committed them to *Writing* before.

By which I am ſufficiently ſatisfied that a reaſonable good *Memory*, fixed with good *Attention*, is capable of being charged with more than a Man would at firſt imagine.

The Credibility *of* Human Teſtimony; *by* . . . . . *n.* 256. *p.* 359.

XXV. *Moral Certitude abſolute*, is that in which the Mind of Man intirely acquieſces, requiring no further Aſſurance. As if one, in whom I *abſolutely confide*, ſhall bring me word of 1200 *l.* accruing to me by Gift, or a Ship's Arrival; and for which therefore I would not give the leaſt valuable Conſideration to be inſured.

Moral Certitude in complete, has its ſeveral *Degrees* to be eſtimated by the *Proportion* it bears to the *abſolute*. As if one, in whom I have that *Degree* of *Confidence*, as that I would not give above *one* in 6 to be *inſured* of the Truth of what he ſays, ſhall inform me, as above, concerning 1200 *l.* I may then reckon that I have as good as the *abſolute Certainty* of 1000 *l.* or *five Sixths* of *abſolute Certainty* for the whole Sum.

The *Credibility* of any *Reporter* is to be rated, 1. By his *Integrity*, or *Fidelity*; and, 2. By his *Ability*: And a double *Ability* is to be conſidered; both that of *apprehending* what is delivered, and alſo of *retaining* it afterwards, till it be tranſmitted.

What follows concerning the *Degrees* of *Credibility*, is divided into 4 *Propoſitions*. The *two firſt* reſpect the *Reporters* of the Narrative, as they either *tranſmit* ſucceſſively, or *atteſt* concurrently; the *third* the *Subject* of it, as it may conſiſt of ſeveral Articles; and the *fourth* joins thoſe three Conſiderations together, exemplifying them in *oral* and in *written Tradition*.

Prop. I. *Concerning the* Credibility *of a* Report, *made by* ſingle *ſucceſſive* Reporters, *who are equally* credible.

Let their *Reports* have each of them *five Sixths* of *Certainty*, and let the *firſt Reporter* give me a *Certainty* of 1000 *l.* in 1200 *l.* it is plain that the *ſecond Reporter*, who delivers that *Report*, will give me the *Certainty* but of $\frac{5}{6}$ of that 1000 *l.* or the $\frac{5}{6}$ of $\frac{5}{6}$ of the full *Certainty* for the whole 1200 *l.* and ſo a *third Reporter*, who has it from the *ſecond*, would have delivered me, &c.

That is, if *a* be put for the Share of *Aſſurance* a ſingle *Reporter* gives me, and *c* for that which is wanting to make that *Aſſurance* complete; and I therefore ſuppoſed to have $\frac{a}{a+c}$ of *Certainty* from the *firſt Reporter*;

$\frac{5}{6} \cdot \frac{5}{6} - \frac{25}{36}$

I ſhall have from the *ſecond* $\frac{aa}{\overline{a+c}^{2}}$, from the *third* $\frac{a^3}{\overline{a+c}^{3}}$, &c. And accordingly if *a* be = 100, and *c* = 6 (the Number of *Pounds* that an 100 *l.* put out to *Intereſt* brings at the *Year*'s End), and conſequently my Share of *Certainty* from *one Reporter* be = $\frac{100}{106}$ (which is the preſent Value of any *Sum* to be paid *one Year* hence), the Proportion of *Certainty* coming to me from a *ſecond* will be $\frac{100}{106}$ *multiplied* by $\frac{100}{106}$ (which is the preſent Value of *Money* to be paid after *two Years)*, and that from a *third* Hand *Reporter* $=$ $\frac{100}{106}$, thrice *multiplied* into itſelf (the Value of Money payable at the End of *3 Years)*, &c.

Corollary. And therefore, as at the *Rate* of 6 *per Cent.* Intereſt the preſent *Value* of any *Sum* payable after 12 *Years*, is but *half* the *Sum*; ſo if the *Probability* or Proportion of *Certitude* tranſmitted by each *Reporter* be $\frac{100}{106}$, the Proportion of *Certainty*, after twelve ſuch Tranſmiſſions, will be but as an *Half*; and it will grow by that time an equal Lay, whether the *Report* be *true* or no. In the ſame Manner, if the *Proportion* of *Certainty* be ſet at $\frac{100}{101}$, it will come to an *Half* from the 70th Hand; and if at $\frac{1000}{1001}$, from the 695th.

Prop. II. *Concerning* concurrent *Teſtifications.*

If *two concurrent Reporters* have, each of them, as $\frac{5}{6}$ of *Certainty*, they will both give me Aſſurance of $\frac{35}{36}$, or of 35 to *one*; if *three*, an Aſſurance of $\frac{215}{216}$, or of 215 to *one.*

For if *one* of them gives a *Certainty* for 1200*l.* as of $\frac{5}{6}$, there remains but an Aſſurance of $\frac{1}{6}$, or of 200*l.* wanting to me, for the whole; and towards that the *ſecond Atteſtor* contributes, according to his Proportion of *Credibility*, that is, to $\frac{5}{6}$ of *Certainty* before had, he adds $\frac{5}{6}$ of the $\frac{1}{6}$, which was wanting: So that there is now wanting but $\frac{1}{6}$ of $\frac{1}{6}$, that is, $\frac{1}{36}$; and conſequently I have, from them both, $\frac{35}{36}$ of *Certainty.* So from *three*, $\frac{215}{216}$, &c.

That is, if the *firſt Witneſs* gives me $\frac{a}{a+c}$ of *Certainty*, and there is wanting of it $\frac{c}{a+c}$; the *ſecond Atteſtor* will add $\frac{a}{a+c}$ of that $\frac{c}{a+c}$; and, conſequently, leave nothing but $\frac{c}{a+c}$ of that $\frac{a}{a+c} = \frac{c^2}{\overline{a+c}^{2}}$: And, in like manner, the *third Atteſtor* adds his $\frac{a}{a+c}$ of that $\frac{c^2}{\overline{a+c}^{2}}$, and leaves wanting only $\frac{c^3}{\overline{a+c}^{3}}$, &c.

Corollary. Hence it follows, that if a *ſingle Witneſs* ſhould be only ſo far *credible*, as to give me the *Half* of a *full Certainty*; a *ſecond* of the ſame *Credibility* would (joined with the *firſt)* give me $\frac{3}{4}$, a *third* $\frac{7}{8}$, &c. ſo that the *Coatteſtation* of a *tenth* would give me $\frac{1023}{1024}$ of *Certainty*, and the *Coatteſtation* of a *twentieth* $\frac{2096999}{2097000}$, or above *two Millions* to *one*, &c.

Prop. III. *Concerning the Credit of a* Reporter *for a particular* Article *of that Narrative, for the* whole *of which he is* credible *in a certain Degree.*

Let there be *ſix* Particulars of a *Narrative* equally remarkable: If he to whom the *Report* is given has $\frac{5}{6}$ of *Certainty* for the whole Sum of them, he has 35 to *one*, againſt the *Failure* in any *one* certain *Particular*.

For he has 5 to *one* there will be no *Failure* at all; and if there be, he has yet another 5 to *one* that it falls not upon that ſingle Particular of the *ſix*: That is, he has $\frac{5}{6}$ of *Certainty* for the whole; and, of the $\frac{1}{6}$ wanting, he has likewiſe $\frac{5}{6}$, or $\frac{5}{36}$ of the whole, more: And therefore, that there will be no *Failure* in that *ſingle Particular*, he has $\frac{5}{6}$ and $\frac{5}{36}$ of *Certainty*; or $\frac{35}{36}$ of it.

In general, if $\frac{a}{a+c}$ be the *Proportion* of *Certainty* for the whole, and $\frac{m}{m+n}$ be the *Chance* of the reſt of the *particular* Articles *m*, againſt ſome *one* or *more* of them *n*, there will be nothing wanting to an *abſolute Certitude*, againſt the not failing in the Article or Articles *n*, but only $\frac{n\,c}{\overline{m+n}\times\overline{a+c}}$.

Prop. IV. *Concerning the* Truth *of either* oral *or* written Tradition *(in whole, or in Part)* ſucceſſively *tranſmitted, and alſo* coatteſted *by ſeveral* Succeſſions *of* Tranſmittents.

1. Suppoſing the *Tranſmiſſion* of an *oral Narrative* to be ſo performed by a *Succeſſion* of *ſingle* Men, or joined in *Companies*, as that each *Tranſmiſſion*, after the *Narrative* has been kept for 20 *Years*, impairs the *Credit* of it a 12th Part; and that conſequently, in the 12th *Hand*, or at the End of 240 *Years*, its *Certainty* is reduced to an *Half*; and there grows then an even Lay (by the *Corollary* of the 2d *Propoſition)* againſt the *Truth* of the *Relation*: Yet if we further ſuppoſe, that the ſame *Relation* is *coatteſted* by 9 other ſeveral *Succeſſions*, *tranſmitting* alike each of them, the *Credibility* of it, when they are all found to agree, will (by the *Corollary* of the *firſt Propoſition)* be as $\frac{1023}{1204}$ of *Certainty*, or above a *Thouſand* to *one*; and if we ſuppoſe a *Coatteſtation* of 19, the *Credibility* of it will be, as above 2 *Millions* to *one*.

2. In *oral Tradition*, as a *ſingle* Man is ſubject to much Caſualty, ſo a *Company* of Men cannot be ſo eaſily ſuppoſed to join; and therefore the *Credibility* of $\frac{100}{106}$, or about $\frac{19}{20}$, may poſſibly be judged too high a Degree for an *oral Conveyance*, to the Diſtance of 20 *Years*: But in *written Tradition* the *Chances* againſt the *Truth* or *Conſervation* of a *ſingle Writing* are far leſs; and ſeveral *Copies* may alſo be eaſily ſuppoſed to concur, and thoſe ſince the Invention of *Printing* exactly the ſame; ſeveral alſo *diſtinct Succeſſions* of ſuch *Copies* may be as well ſuppoſed, taken by *different* Hands, and preſerved in different Places or *Languages*.

And therefore if *Oral Tradition* by any *one* Man, or *Company* of Men, might be ſuppoſed to be *credible* after 20 *Years*, at $\frac{19}{20}$ of *Certainty*, or but $\frac{9}{10}$ or $\frac{5}{6}$, a *written Tradition* may be well imagined to continue, by the *joint Copies* that may be taken of it for *one* Place (like the ſeveral *Copies* of the ſame *Impreſſion)* during the Space of 100, if not 200 *Years*; and to be then *credible* at $\frac{100}{101}$ of *Certainty*, or at the *Proportion* of 100 to 1. And then ſeeing that the *ſucceſſive Tranſmiſſions* of this $\frac{100}{101}$ of *Certainty* will not *diminiſh* it to an *Half* until it paſſes the 69th *Hand* (for it will be near 70 *Years* before the *Rebate* of *Money*, at that *Intereſt*, will ſink it to *half*), it is plain, that *written Tradition*, if preſerved but by a *ſingle Succeſſion* of *Copies*, will not loſe *half* of its full *Certainty* until 70 times 100, if not 200 *Years*, are paſt; that is, 7,000, if not 14,000 *Years*. And further, that if it be likewiſe preſerved by *concurrent Succeſſions* of ſuch *Copies*, its *Credibility* at that Diſtance may be even *increaſed*, and grow far more *certain* from the ſeveral agreeing Deliveries at the End of 70 *Succeſſions*, than it would be at the very *firſt* from either of the *ſingle Hands*.

3. *Laſtly*, In ſtating the *Proportions* of *Credibility* for any *Part* or *Parts* of a *Copy*, it may be obſerved, that in an *Original*, not very long, good Odds may be laid, that a *Copy* by a careful Hand ſhall not have ſo much as a *literal Fault*; but, in one of greater Length, that there may be greater Odds againſt any *material Error*, and ſuch as ſhall alter the *Senſe*; greater yet, that the *Senſe* ſhall not be altered in any *conſiderable Point*; and ſtill greater, if there be many of theſe *Points*, that the *Error* lights not upon ſuch a *ſingle Article*; as in the *third Propoſition*.

XXVI. At *London*, in the *Year* 1685. there were

General Bills of Mortality *in* London. *n.*177.*p.*1245.

	Chriſtened;	*Males*, 7484.	*Females*, 7246.	in all, 14730.
	Buried;	*Males*, 11891.	*Females*, 11331.	in all, 23222.
An. 1686.	*Chriſtened*;	*Males*, 7575.	*Females*, 7119.	in all, 14694.
	Buried;	*Males*, 11828.	*Females*, 10781.	in all, 22609.
An. 1687.	*Chriſtened*;	*Males*, 7737.	*Females*, 7213.	in all, 14951.
	Buried;	*Males*, 11174.	*Females*, 10286.	in all, 21460.

*n.*191.*p.*445.

XXVII. *The Number of the* Houſes *and* Hearths *in* Dublin; *by Capt.* South. *n.*261.*p.*518.

		Good.	*Poor.*	*Waſte.*	*Total.*
Jan. $169\frac{5}{6}$	*Houſes* —	4665	485	849	5999
$169\frac{6}{7}$		4905	502	717	6124
Jan. $169\frac{5}{6}$	*Hearths* —	24402	1080	3439	29220
$169\frac{6}{7}$		25366	1227	2027	29519

In the *Total* of *Hearths*, there are included 299, which are in *Colleges*, &c. and are not reckoned in the 3 *firſt Columns*.

XXVIII.
The Number of People *in* Ireland An. 1695. *by Capt.* South. *n.* 261. *p.* 520.

County of *Ardmagh*	Perſons *Aſſeſſed*	25185	25640
	Perſons *Exempted*	455	
County of *Lowth*	Perſons *Aſſeſſed*	16502	17203
	Perſons *Exempted*	701	
County of *Meath*	Perſons *Aſſeſſed*	42181	43319
	Perſons *Exempted*	1138	
Total of theſe *three Counties*			86162
City of *Dublin*			40508
In the reſt of the Kingdom, according to the *firſt Quarter's Aſſeſſment* of the *Poll*, there are, in Proportion to the above 3 *Counties*, which were very exactly returned - - - - -			907432
		Total	1034102

XXIX.
A Liſt of the Sea-faring People *in* Ireland, A. 1697. *by Capt.* South. *n.* 261. *p.* 519.

	Sea-men.	*Fiſher-men.*	*Boat-men.*	*Total.*	*Whereof Papiſts.*
Baltimore and Members	9	188	84	281	268
Belfaſt, &c. *Carrickfergus* included	194	62	12	268	2
Coleraine	48	233	169	450	209
Cork	58	34	91	183	111
Donoghade, whereof *Maſters* 35	283	28	2	313	
Drogheda	22	56		78	61
Dublin	42	271	99	412	276
Dundalk and *Carlingford*	2	90		92	51
Gallway	42	42	88	172	140
Killebeggs	5	120	4	129	78
Kinſale	104	76	45	225	106
Limerick	13		137	150	132
Londonderry	56	46	22	124	36
Roſſe	20	85	77	182	148
Sligoe	11	68	8	87	60
Strangford	69	159	12	240	78
Tralee and *Kerry*	2	165		167	163
Waterford	36	83	50	169	143
Wexford	80	346		426	399
Wicklow	22	49	5	76	58
Youghall	40	114	46	200	135
Total	1158	2315	951	4424	2654

XXX. *The Number of the* Romiſh Clergy *in* Ireland An. 1698. *by Capt.* South. *n.* 261. *p.* 521.

Counties.	Regulars.	Seculars.	Counties.	Regulars.	Seculars.
Cavan	5	29	*Kildare*	9	16
Fermanagh	6	13	*Lowth*	12	14
Donegal	22	24	*Carlow*	8	8
Tyrone	7	22	*Kilkenny*	17	30
Downe	4	15	*King's County*	13	19
Antrim	5	13	*Queen's County*	1	16
Ardmagh	4	10	*Weſt-Meath*	16	22
Monoghan	5	20	*Longford*	15	22
Waterford	16	23	*Roſcommon*	24	52
Limerick	15	51	*Leitrim*	13	20
Clare	18	43	*Sligoe*	31	31
Cork	30	97	*Mayoe*	42	50
Kerry	19	23	*Gallway*	39	45
Tipperary	48	39	*Meath*	19	23
Londonderry	5	15	*Dublin*	1	26
Wicklow	6	15	*Drogheda* Town	4	2
Wexford	16	24			
			Total	495	872

Shipped for *Foreign* Parts, by *Act of Parliament*, the Number of *Regulars* following, their Paſſage and Proviſions being paid for by the Government; *viz.*

From	*Dublin*	153
	Gallway	170
	Cork	75
	Waterford	26
	Total	424

XXXI. *Bills of* Marriages, Births, *and* Burials, *in* Frankfort on the Maine; *by Dr.* Fred. Slare. *n.* 229. *p.* 559.

An. 1695.	*Married.*	*Chriſtened.*	*Buried.*	An. 1695.	*Married.*	*Chriſtened.*	*Buried.*
January	23	79	72	*July*	21	69	56
February	17	67	76	*Auguſt*	28	78	63
March	00	65	62	*September*	15	73	63
April	35	78	58	*October*	31	86	45
May	25	89	77	*November*	25	69	45
June	20	75	74	*December*	08	88	57
				Sum	248	916	748

So that there were *married* 248 *Couples*; and amongſt them 2 *Couples* that lived before, 50 *Years* in *Matrimony*.

Chriſtened
- In *Frankfort*; *Citizens Children*, 534. *Foreigners*, 234. *Males*, 420: *Females*, 348. In all, 768. And amongſt them *Twins*, 11. *Poſthumous*, 11. *Jews*, 2. *Baſtards*, 13.
- In *Sachſenhouſen*; *Citizens Children*, 94. *Foreigners*, 54. *Males*, 84. *Females*, 64. In all, 148. And amongſt them, *Twins*, 3. *Poſthumous*, 1. *Baſtards*, 2.

Chriſtened in all, 916.

Deceaſed
- In *Franckfort*; *Citizens*, 63. *Women*, 39. *Widows*, 24. *Sons*, 153. *Daughters*, 123. *Not Chriſtened*, 7. *Foreigners*, 194. Out of the *Hoſpital*, 30. Out of the *Alms*, *Orphans*, and *Work-Houſes*, 9. In all, 642.
- In *Sachſenhouſen*; *Citizens*, 8. *Women*, 3. *Widows*, 3. *Sons*, 20. *Daughters*, 14. *Not Chriſtened*, 3. *Foreigners*, 55. In all, 160.

Deceaſed in all, 748.

XXXII. Marriages, Births, *and* Burials, *in* Old, Middle, *and* Lower Marck. *n.* 260. *p.* 471.

In the *Year* 1698.	*Married.*	*Chriſtened.*	*Baſtards.*	*Buried.*
In *Thurfurſtl, Schloband Dohm-Kirchen*	63	117		69
In *Berlin*	88	332	9	200
In *Berliniſchen* Inſpect.	185	717	26	469
In *Berlin* Suburbs	36	143	14	136
In *Collen*	62	188	4	98
In *Colleniſchen* Inſpect.	58	263	4	88
In *Colleniſchen* Suburbs	11	87	8	17
In *Frederechſweſder*	22	103	4	51
In *Dorotheen-Stadt*	26	100		36
In *Frederich-Stadt*	38	146	12	37
Of the *Guarniſon*				
Die *Frankoſiſ. Gemeinde in beiſigen Thurf. Reſidenk Stadten*	57	259		138
Alleſtadr Brandenb. Inſ.				
Reuſtadt Brandenb. Inſpection	99	388		166
Stifft Brandenb. Inſp.	56	235		129
Franctfurtiſche Inſp.	243	872		438
Reformirte Gemeinde zu *Franckfurt* an der *Oder*				
Perlebergiſche Inſp.	92	375		226
Reuen Ruppiniſche Inſp.	82	330		171
Wittſtoctiſche Inſpect.	46	211		111
Havelbergiſche Inſp.	30	154		86
Im *Dohm* zu *Havelberg*	16	93		55
Prikwalctiſche Inſp.	82	314		163
Spandowiſche Inſp.	94	364		170
Reform. Gemeinde zu *Spandow*	4	12		3
Ropenict und Zugehorige *Dorffer*				
Die *Frankoſiſche* Gemeinde zu *Spandow*				
Duranienburg	12	30	2	22
Reformirte Gemeinde zu *Duranienburg*				
Bernaviſche Inſp.	62	231	2	100
Granſeeiſche Inſp.	15	62		29
Reformirte Gemeinde zu *Granſee*				
Prenklowiſche Inſp.	257	802	23	361
Joſſenſche Inſp.	41	161		80
Joachimſthal und *Zugehorige Dorffer*	9	49	5	13

In the *Year* 1698.	*Married.*	*Chriſtened.*	*Baſtards.*	*Buried.*
Straukbergiſche Inſp.	22	93		44
Zehdenictſche Inſp.	40	148		88
Ravenſche Inſp.	142	303		67
Reu - Angermundiſche Inſp.	102	362	9	154
Lenkenſche Inſp.	51	220		127
Rathenowiſche Inſp.	92	381		180
Wriekenſche Inſp.	52	193		110
Treven Briekenſche Inſp.	34	127		52
Beelikſche Inſp.	28	93		57
Beeklowiſche Inſp.	50	206		87
Mittenwaldiſche Inſp.	23	84		48
Lindowiſche Inſp.	16	96	1	42
Furſtenwaldiſche Inſp.	26	95	4	42
Reuſtadt Eberkwaldiſche Inſp.	22	118	6	51
Munchebergiſche Inſp.	64	236		121
Stendaliſche Inſp.	95	226		186
Altwadt Galkewedelſche Inſp.	142	521	25	320
Rouſtadt Galkwedel	11	56	4	43
Putliſche Inſp.	49	188		94
Gardelegenſche Inſp.	94	393	2	232
Geebauſenſche Inſp.	109	321		260
Ayrikſche Inſp.	39	144		82
Apenburgiſche Inſp.				
Tangermundiſche Inſp.	71	330		132
Ziegeſarſche Inſp.	44	146		85
Werbenſche Inſp.	43	157		90
Wilknactſche Inſp.	19	80		42
Wuſterbauſenſche Inſp.	71	251		127
Calbiſche Inſp.	67	201		120
Templiniſche Inſp.	27	117		63
~~*Gramzowiſche* Inſp.~~	36	135	7	59
Oſterburgiſche Inſp.	32	147		78
Straakburgiſche Inſp.	25	138		69
Trebbin	7	44	2	18
Teltow	1	30		8
Liebenberg	10	24		4
Storctowiſche Inſp.	37	178	1	66
Alten Landsberg und *Zugehorige Dorffer*	9	24		17
Reform. Gem. zu *Alten Landsburg Buchholk*	11	32	1	11

The *Sum* of the *married*, 3698. *Chriſtened*, 13776, whereof *Baſtards*, 173. *Deceaſed*, 7138.

XXXIII. Mar-

XXXIII. Marriages, Births, *and* Burials, *in the Dominions of the* E. *of* Brandenburg.

In the *Year* 1698.	*Married.*	*Chriſtened.*	*Buried.*
In der *Chur* und *Mard-Brandenburg*	3702	13793	7149
In der *Neu-Ward* und *Lande Sternberg*	1528	5946	3211
Im *Herkogthumb Preuſſen*	616	21803	17991
Im *Herkogthumb Magdeburg*	1357	5480	3042
Im *Herkogthumb Cleve* und *Graffſchafft Marck*	1888	6178	4215
Im *Herkogthumb Pommern*	1714	7244	4827
Im *Furſtenthumb Halberſtadt*	488	2297	1192
Im *Furſtenthumb Minden*	525	1937	1326
In der *Graffſchafft Hohenſtein*	145	568	415
In der *Graffſchafft Ravensberg*	665	2223	1789
In der *Herrſchafft Lauenburg* und *Butow*	125	495	421
The Sum	18298	67763	44678

n. 281. *p.* 508.

The Value of Annuities *upon* Lives, *drawn from the* Bills *of* Mortality *at* Breſlaw; *by Mr.* Edmund Halley. *n.* 196. *p.* 596.

XXXIV. The City of *Breſlaw* is the Capital City of the Province of *Sileſia*, or, as the *Germans* call it, *Schleſia*; and is ſituated on the eaſtern Bank of the River *Oder*, antiently called *Viadrus*, near the Confines of *Germany* and *Poland*, and very nigh the *Latitude* of *London*. It is very far from the Sea, and as much a *mediterranean* Place as can be deſired; whence the Confluence of *Strangers* is but ſmall, and the Manufacture of *Linen* employs chiefly the poor People of the Place, as well as of the Country round about; whence comes that Sort of *Linen* we uſually call your *Scleſie Linen*, which is the chief, if not the only Merchandize of the Place. For theſe Reaſons the *Degrees* of *Mortality* in this City ſeem moſt proper for a *Standard*, and the rather, for that the *Births* do a ſmall matter exceed the *Funerals*: The only thing wanting is the *Number* of the *whole People*, which in ſome meaſure I have endeavoured to ſupply by Compariſon of the *Mortality* of the People of all *Ages*; which I ſhall trace out, with all the Accuracy poſſible, from the curious Tables of the *Births* and *Funerals* drawn up monthly by Dr. *Newman*, of that City.

It thence appears, that, in the *five Years* from 87 to 91 *incluſive*, there were *born* 6193 Perſons, and *buried* 5869; that is, *born per Annum* 1238, and *buried* 1174. Whence an *Increaſe* of the People may be argued of 64 *per Annum*, or of about a 20th Part; which may perhaps be balanced by the *Levies* for the *Emperor*'s Service of his Wars. But this being contingent, and the *Births* certain, I will ſuppoſe the People of *Breſlaw* to be increaſed by 1238 *Births annually*. Of theſe it appears by the ſame *Tables*, that 348 do *die yearly* in the *firſt Year* of their Age, and that but 890 do arrive at a full *Year*'s Age; and likewiſe, that 193 do *die* in the *five Years* between 1 and 6 complete, taken at a *Medium*; ſo that but 692 of the Perſons *born* do ſurvive 6 whole *Years*. From this Age the Infants, being arrived at ſome Degree of Firmneſs, grow leſs and leſs mortal; and it appears, that of the whole People of *Breſlaw* there die *yearly* as in the following *Table*; wherein the *upper Line* ſhews the *Age*, and the next under it the *Number* of Perſons of that Age *dying yearly*.

7.	8.	9.	..	14.	..	18.	..	21.	..	27.	28.	..	35.	36.	..	42.	..	45.	..
11.	11.	6.	$5\frac{1}{2}$	2.	$3\frac{1}{2}$	5.	6.	$4\frac{1}{2}$	$6\frac{1}{2}$	9.	8.	7.	7.	8.	$9\frac{1}{2}$	8.	9.	7.	7.

49.	54.	55.	56.	..	63.	..	70.	71.	72.	..	77.	..	81.	..	84.	..	90.	91.
10.	11.	9.	9.	10.	12.	$9\frac{1}{2}$	14.	9.	11.	9.	6.	7.	3.	4.	2.	1.	1.	1.

98.	99.	100.
0.	$\frac{1}{5}$	$\frac{2}{5}$.

And where no *Figure* is placed over, it is to be underſtood of thoſe that die between the *Ages* of the preceding and conſequent Column.

From this *Table* it is evident, that from the Age of 9 to about 25, there does not *die* above 6 *per Annum* of each Age, which is much about one *per Cent*. of thoſe that are of thoſe Ages: And whereas in the 14, 15, 16, 17 Years there appear to *die* much fewer, as 2 and $3\frac{1}{2}$, yet that ſeems rather to be attributed to Chance; as are the other Irregularities in the Series of *Ages*, which would rectify themſelves, were the Number of Years much more conſiderable, as 20 inſtead of 5. And by our own Experience in *Chriſt-Church* Hoſpital I am informed, there *die* of the *young Lads*, much about *One per Cent. per Annum*, they being of the aforeſaid *Ages*. From 25 to 50, there ſeem to die from 7 or 8, and 9 *per Annum*, of each *Age*; and after that to 70, they growing more crazy, though the *Number* be much diminiſhed, yet the *Mortality* increaſes, and there are found to *die* 10 or 11 of each *Age per Annum*. From thence the Number of the *living* being very ſmall, they gradually decline till there be none left to *die*; as may be ſeen at one View in the *Table*.

From theſe Conſiderations I have formed the adjoined *Table*, whoſe Uſes are manifold, and give a more juſt *Idea* of the *State* and *Condition* of *Mankind*, than any thing yet extant that I know of. It exhibits the *Number* of People in the City of *Breſlaw* of all *Ages*, from the *Birth* to extreme *old Age*, and thereby ſhews the *Chances* of Mortality at all *Ages*; and likewiſe how to make a certain Eſtimate of the *Value* of *Annuities* for *Lives*, which hitherto has been only done by an imaginary *Valuation*: Alſo the *Chances* that there are that a Perſon of any *Age* propoſed does *live* to any *Age* given; with many more, as I ſhall hereafter ſhew. This *Table* does ſhew the *Number* of Perſons that are *living* in the *Age current* annexed thereto, as follows.

Age Cur.	Per- *ſons.*	*Age* Cur.	Per- *ſons.*	*Age* Cur.	Per- *ſons.*	*Age* Cur.	Per- *ſons.*	*Age* Cur	Per- *ſons.*	*Age* Cur.	Per- *ſons.*
1	1000	8	680	15	628	22	586	29	539	36	481
2	855	9	670	16	622	23	579	30	531	37	472
3	798	10	661	17	616	24	573	31	523	38	463
4	760	11	653	18	610	25	567	32	515	39	454
5	732	12	646	19	604	26	560	33	507	40	445
6	710	13	640	20	598	27	553	34	499	41	436
7	692	14	634	21	592	28	546	35	490	42	427
Age Cur.	Per- *ſons.*	*Age* Cur.	Per- *ſons.*	*Age* Cur.	Per- *ſons.*	*Age* Cur.	Per- *ſons*	*Age* Cur.	Per- *ſons.*	*Age* Cur.	Per- *ſons.*
43	417	50	346	57	272	64	201	71	131	78	58
44	407	51	335	58	262	65	192	72	120	79	49
45	397	52	324	59	252	66	182	73	109	80	41
46	387	53	313	60	242	67	172	74	98	81	34
47	377	54	302	61	232	68	162	75	88	82	28
48	367	55	292	62	222	69	152	76	78	83	23
49	357	56	282	63	212	70	142	77	68	84	20

Age.	*Perſons.*
7	5547
14	4584
21	4270
28	3964
35	3604
42	3178
49	2709
56	2194
63	1694
70	1204
77	692
84	253
100	107
Sum Total	34000

Thus it appears, that the *whole People* of *Breſlaw* does conſiſt of 34000 *Souls*, being the *Sum Total* of the Perſons of all *Ages* in the *Table.*

The *firſt Uſe* hereof is to ſhew the *Proportion* of Men able to *bear Arms* in any Multitude, which are thoſe between 18 and 56, rather than 16 and 60; the one being generally too weak to bear the Fatigues of *War*, and the Weight of *Arms*, and the other too crazy and infirm from *Age*, notwithſtanding particular Inſtances to the contrary. Under 18, from the *Table*, are found in this *City* 11997 Perſons, and 3950 above 56, which together make 15947. So that the Reſidue to 34000 being 18053, are Perſons between thoſe *Ages*. At leaſt one *half* thereof are *Males*, or 9027: So that the whole *Force* this City can raiſe of *fencible Men*, as the *Scotch* call them, is about 9000, or $\frac{9}{34}$, or ſomewhat more than a *Quarter* of the *Number* of Souls; which may perhaps paſs for a *Rule* for all other Places.

The *ſecond Uſe* of this *Table* is, to ſhew the differing *Degrees* of *Mortality*, or rather *Vitality*, in all *Ages:* For if the *Number* of *Perſons* of any *Age* remaining after *one Year* be *divided* by the Difference between that and the Number of the *Age* propoſed, it ſhews the *Odds* that there is, that a Perſon of that *Age* does not *die* in a *Year*. As for Inſtance, a Perſon 25 *Years* of *Age* has the Odds of 560 to 7, or 80 to 1, that he does not *die* in a *Year:* Becauſe that of 567 *living* of 25 *Years* of *Age*, there do *die* no more than 7 in a *Year*, leaving 560 of 26 *Years* old.

So likewiſe for the *Odds* that any Perſon does not *die* before he attain any propoſed *Age*, take the Number of the remaining Perſons of the *Age* propoſed, and *divide* it by the Difference between it and the Number of thoſe of the *Age* of the Party propoſed; and that ſhews the *Odds* there is between the *Chances* of the Parties *living* or *dying*. As for Inſtance; What is the *Odds* that a Man of 40 *lives* 7 *Years?* Take the *Number* of Perſons of 47 *Years*, which in the *Table* is 377, and *ſubtract* it from the *Number* of Perſons of 40 *Years*, which is 445, and the Difference is 68; which ſhews that the Perſons *dying* in that 7 *Years* are 68, and that it is 377 to 78, or 5½ to 1, that a Man of 40 does *live* 7 *Years*. And the like for any other *Number* of *Years*.

Uſe III. But if it be required at what *Number* of *Years* it is an *even Lay*, that a Perſon of any *Age* ſhall *die*, this *Table* readily performs it: For if the *Number* of Perſons *living*, of the *Age* propoſed, be *halfed*, it will be found by the *Table* at what *Year* the ſaid Number is reduced to *half* by *Mortality*; and that is the *Age* to which it is an *even Wager* that a Perſon of the *Age* propoſed ſhall arrive before he *die*. As for Inſtance; A Perſon of 30 *Years* of *Age* is propoſed, the *Number* of that *Age* is 531, the *Half* thereof is 275, which Number I find to be between 57 and 58 *Years*; ſo that a Man of 30 may reaſonably expect to *live* between 27 and 28 *Years*.

Uſe IV. By what hath been ſaid, the *Price* of *Inſurance* upon *Lives* ought to be regulated; and the Difference is diſcovered between the Price of *inſuring* the *Life* of a Man of 20 and 50, for *Example*; it being 100 to 1 that a Man of 20 *dies* not in a *Year*, and but 38 to 1 for a Man of 50 *Years* of *Age*.

Uſe V. On this depends the *Valuation* of *Annuities* upon *Lives*; for it is plain, that the Purchaſer ought to pay for only ſuch a Part of the *Value* of the *Annuity* as he has *Chances* that he is *living*; and this ought to be computed *yearly*, and the *Sum* of all thoſe *yearly Values*, being added together, will amount to the *Value* of the *Annuity* for the *Life* of the Perſon propoſed.

Now the *preſent Value* of Money payable after a *Term* of *Years*, at any given *Rate* of *Intereſt*, either may be had from *Tables* already computed, or, almoſt as compendiouſly, by the *Table* of *Logarithms:* For the *Arithmetical Complement* of the *Logarithm* of *Unity* and its *yearly Intereſt* (that is, of 1, 06. for 6 *per Cent.* being 9,974694) being *multiplied* by the *Number* of *Years* propoſed, gives the *preſent Value* of *one Pound* payable after the End of ſo many *Years*. Then, by the foregoing *Propoſition*, it will be, as the *Number* of *Perſons living* after that Term of *Years*, to the *Number dead*, ſo are the *Odds* that any *one* Perſon is *alive* or *dead*. And by Conſequence, as the *Sum* of both, or the Number of Perſons *living* of the *Age* firſt propoſed, to the Number remaining after ſo many *Years* (both given by the *Table*), ſo the preſent *Value* of the *yearly Sum*, payable after the *Term* propoſed, to the *Sum* which ought to be paid for the *Chance* the Perſon has to enjoy ſuch an *Annuity* ſo many *Years*. And this being repeated for every *Year* of the Perſon's *Life*, the *Sum* of all the *preſent Values* of thoſe *Changes* is the true *Value* of the *Annuity*. This will, without doubt, appear to be a moſt laborious Calculation; but it being one of the principal *Uſes* of this Speculation, and having found ſome *Compendia* for the Work, I took the Pains to compute the following *Table*; being the ſhort Reſult of a not ordinary Number of *arithmetical Operations*. It ſhews the *Value* of *Annuities* for every *fifth Year* of *Age*, to the *70th*, as follows:

Age.	*Years Purchaſe.*	*Age.*	*Years Purchaſe.*	*Age.*	*Years Purchaſe.*
1	10,28	25	12,27	50	9,21
5	13,40	30	11,72	55	8,51
10	13,44	35	11,12	60	7,60
15	13,33	40	10,57	65	6,54
20	12,78	45	9,91	70	5,32

Uſe VI. *Two Lives* are likewiſe *valuable* by the ſame Rule: For the Number of *Chances* of each *ſingle* Life, found in the *Table*, being *multiplied* together, become the *Chances* of the *two Lives*. And after any certain *Term* of *Years*, the *Product* of the two remaining *Sums* is the *Chances* that *both* the Perſons are *living*; the *Product* of the two *Differences*, being the *Numbers* of the *Dead* of both *Ages*, are the *Chances* that *both* the Perſons are *dead*; and the two *Products* of the remaining *Sums* of the one *Age multiplied* by thoſe *dead* of the other, ſhew the *Chances* that there are that each Party *ſurvives* the other; whence is derived the *Rule* to eſtimate the *Value* of the *Remainder* of one Life after another. Now as the *Product* of the two Numbers in the *Table* for the two *Ages* propoſed, is to the Difference between that *Product* and the *Product* of the two Numbers of Perſons *deceaſed* in any Space of Time; ſo is the *Value* of a Sum of *Money* to be paid after ſo much Time, to the *Value* thereof under the Contingency of *Mortality:* And as the aforeſaid *Product* of the two Numbers anſwering to the *Ages* propoſed, to the *Product* of the *deceaſed* of one *Age multiplied* by thoſe remaining *alive* of the other; ſo the *Value* of a Sum of *Money* to be paid after any Time propoſed, to the *Value* of the *Chances* that the one Party has, that he ſurvives the other whoſe Number of *Deceaſed* you made uſe of in the *ſecond Term* of the *Proportion*. This perhaps may be better underſtood by putting N for the Number of the *younger Age*, and n for that of the *elder*, $Y y$ the *deceaſed* of both *Ages* reſpectively, and $R r$ for the *Remainders*; and $R + Y = N$, and $r + y = n$: Then ſhall $N n$ be the whole Number of *Chances*, $N n - Y y$ the *Chances* that one of the 2 Perſons is *living*, $Y y$ the *Chances* that they are both *dead*, $R y$ the *Chances* that the *elder* Perſon is *dead* and the *younger living*, and $r Y$ the *Chances* that the *elder* is *living* and the *younger dead*. Thus 2 Perſons of 18 and 35 are propoſed, and after 8 *Years* theſe *Chances* are required: The Numbers for 18 and 35 are 610 and 490, and there are 50 of the *firſt Age dead in* 8 *Years*, and 73 of the *elder Age*; there are in all 610 × 490, or 298900 *Chances*; of theſe there are 50 × 73, or 3650, that they are both *dead*. And as 298,900, to 298,900, — 3,650, or 295,250, ſo is the *preſent Value* of a Sum of *Money* to be paid after 8 *Years*, to the *preſent Value* of a Sum to be paid, if either of the two *live*. And as 560 × 73, ſo are the *Chances* that the *elder* is *dead*, leaving the *younger*; and as 417 × 50, ſo are the *Chances* that the *younger* is *dead*, leaving the *elder*. Wherefore as 610 × 490 to 560 × 73, ſo is the *preſent Value* of a Sum to be paid at 8 *Years* End, to the Sum to be paid for the *Chance* of the *younger's Survivance*; and as 610 × 490, to 417 × 50, ſo is the ſame *preſent Value* to the Sum to be paid for the *Chance* of the *Elder's Survivance*.

Fig. 81. This poſſibly may be yet better explained by expounding theſe *Products* by *rectangular Parallelograms*, as in *Fig.* 81. wherein *A B*, or *C D*, repreſents the *Number* of Perſons of the *younger Age*; and *D E*, *B H*, thoſe remaining *alive* after a certain *Term* of *Years*; whence *C E* will anſwer the Number of thoſe *dead* in that Time: So *A C*, *B D*, may repreſent the Number of the *elder Age*; *A F*, *B I*, the *Survivors* after the ſame Term; and *C F*, *D I*, thoſe of that *Age* that are *dead* at that Time: Then ſhall the whole *Parallelogram A B C D* be *N n*, or the *Product* of the two Numbers of Perſons repreſenting ſuch a Number of Perſons of the two *Ages* given; and by what was ſaid before, after the Term propoſed the *Rectangle H D* ſhall be as the Number of Perſons of the *younger Age* that *ſurvive*, and the *Rectangle A E*, as the Number of thoſe that *die*. So likewiſe the *Rectangle A I*, *F D*, ſhall be as the Numbers *living*, and *dead*, of the other *Age*. Hence the *Rectangle H I*, ſhall be as an equal Number of both *Ages ſurviving*; the *Rectangle F E*, being the *Product* of the *deceaſed Y y*, an equal Number of both *dead*; the *Rectangle G D*, or *R y*, a Number *living* of the *younger Age*, and *dead* of the *elder*; and the *Rectangle A G*, or *r Y*, a Number *living* of the *elder Age*, but *dead* of the *younger*. This being underſtood, it is obvious, that as the *whole Rectangle A D*, or *N n*, is to the *Gnomon F A B D E G*, or *N n* — *Y y*, ſo is the *whole* Number of Perſons or *Chances* to the Number of *Chances* that *one* of the two Perſons is *living*. And as *A D*, or *N n*, is to *F E*, or *Y y*, ſo are all the *Chances* to the *Chance*, that *both* are *dead*; whereby may be computed the *Value* of the *Reverſion* after *both Lives*. And as *A D*, to *G D*, or *R y*, ſo the *whole* Number of *Chances* to the *Chances* that the *younger* is *living* and the *other dead*; whereby may be caſt up what *Value* ought to be paid for the *Reverſion* of one *Life* after another, as in the Caſe of providing for *Clergymens Widows* and others by ſuch *Reverſions*. And as *A D*, to *A G*, or *r Y*, ſo are all the *Chances* to thoſe that the *elder ſurvives* the *younger*. I have been the more particular, and perhaps tedious, in this Matter, becauſe it is the Key to the Caſe of *three Lives*, which of itſelf would not have been ſo eaſy to comprehend.

Uſe VII. If *three Lives* are propoſed, to find the *Value* of an *Annuity* during the Continuance of any of thoſe *three Lives*, the *Rule* is, As the *Product* of the *continual Multiplication* of the 3 Numbers in the *Table*, anſwering to the *Ages* propoſed, is to the *Difference* of that *Product*, and of the *Product* of the 3 Numbers of the *deceaſed* of thoſe *Ages* in any given Term of *Years*;

ſo is the *preſent Value* of a Sum of *Money* to be paid certainly after ſo many *Years*, to the *preſent Value* of the ſame Sum to be paid, provided *one* of thoſe 3 Perſons be *living* at the Expiration of that *Term*. Which Proportion being *yearly* repeated, the *Sum* of all thoſe *preſent Values* will be the *Value* of an *Annuity* granted for 3 ſuch *Lives*. But to explain this, together with all the Caſes of *Survivance* in 3 *Lives*, let N, be the Number in the Table for the *younger Age*; n, for the *ſecond*; and ν, for the *elder Age*: Let Y, be thoſe *dead* of the *younger Age* in the Term propoſed; y, thoſe *dead* of the *ſecond Age*; and υ, thoſe of the *elder Age*; and let R be the *Remainder* of the *younger Age*; r, that of the *middle Age*; and ρ, the *Remainder* of the *elder Age*. Then ſhall $R + Y$, be equal to N; $r + y$, to n; and $\rho + \upsilon$, to ν; and the *continual Product* of the 3 Numbers $Nn\nu$, ſhall be equal to the *continual Product* of $R + Y \times r + y \times \rho + \upsilon$, which being the *whole* Number of *Changes* for 3 *Lives*, is compounded of the *eight Products* following: (1.) $Rr\rho$, which is the Number of *Chances* that all 3 of the Perſons are *living*; (2.) $r\rho Y$, which is the Number of *Chances* that the 2 *elder* Perſons are *living*, and the *younger dead*; (3.) $R\rho y$, the Number of *Chances* that the *middle Age* is *dead* and the *younger* and *elder living*; (4.) $Rr\upsilon$, being the *Chances* that the 2 *younger* are *living* and the *elder dead*; (5.) ρYy, the *Chances* that the 2 *younger* are *dead* and *elder living*; (6.) $rY\upsilon$, the *Chances* that the *younger* and *elder* are *dead* and the *middle Age* living; (7.) $Ry\upsilon$, which are the *Chances* that the *younger* is *living* and the 2 *other dead*; (8.) $Yy\upsilon$, which are the *Chances* that *all three* are *dead*; which latter *ſubtracted* from the *whole* Number of *Chances* $Nn\nu$, leaves $Nn\nu - Yy\upsilon$, the *Sum* of all the other 7 *Products*, in all of which one or more of the 3 Perſons are *ſurviving*.

Fig. 82.

To make this yet more evident, I have added *Fig.* 82. wherein theſe 8 ſeveral *Products* are at one View exhibited. Let the *rectangled Parallelepipedon*, $ABCDEFGH$, be conſtituted of the Sides AB, GH, &c. proportional to N, the Number of the *younger Age*; AC, BD, &c. proportional to n; and AG, CE, &c. proportional to the Number of the *elder*, or ν; and the *whole Parallelepipedon* ſhall be as the *Product* $Nn\nu$, or our *whole* Number of *Chances*. Let BP, be as R; and AP, as Y: Let CL, be as r; and Ln, as y; and GN, as ρ; and NA, as υ; and let the *Plane* $PRea$, be made parallel to the *Plane* $ACGE$; the *Plane* $NVbY$, parallel to $ABCD$; and the *Plane* $LXTQ$ parallel to the *Plane* $ABGH$: And our *firſt Product* $Rr\rho$, ſhall be as the *Solid* $STWIFZeb$; the *ſecond*, or $r\rho Y$, will be as the *Solid* $EYZeQSMI$; the 3*d*, $R\rho y$, as the *Solid* $RHOVWIST$; and the 4*th*, $Rr\upsilon$, as the *Solid* $ZabDWXIK$; 5*thly*, ρYy, as the *Solid* $GQRSIMNO$; 6*thly*, $rY\upsilon$, as $IKLMGYZA$; 7*thly*, $Ry\upsilon$, as the *Solid* $IKPOBXVW$; and *laſtly*, $AIKLMNOP$, will be as the *Product* of the 3 Numbers of Perſons *dead*, or $Yy\upsilon$.

I ſhall not apply this in all the *Caſes* thereof, for Brevity's Sake; only to ſhew in one how all the reſt may be performed, let it be demanded, *what is the* Value *of the* Reverſion *of the* younger Life *after the* two elder *propoſed?* The Proportion is, As the *whole* Number of *Chances*, or $Nn\nu$, to the

Product

Product Ry^{v}, ſo is the certain *preſent Value* of the Sum payable after any *Term* propoſed, to the *Value* due to ſuch *Chances* as the *younger* Perſon has to *bury both* the *elder*, by the *Term* propoſed; which he therefore is to pay for. Here it is to be noted, that the *firſt Term* of all theſe *Proportions* is the ſame throughout; *viz. Nnv*. The *ſecond* changing *yearly* according to the *Decreaſe* of *R r ſ*, and *Increaſe* of Yy^{v}. And the *third* are ſucceſſively the *preſent Value* of Money payable after *one*, *two*, *three*, &c. *Years*, according to the Rate of *Intereſt* agreed on. Theſe Numbers, which are in all Caſes of *Annuities* of neceſſary Uſe, I have put into the following Table, they being the *decimal Values* of *one Pound* payable after the Number of *Years* in the *Margent*, at the Rate of 6 *per Cent*.

Years.	*Preſent Value of* 1 *l.*	*Years.*	*Preſent Value of* 1 *l.*	*Years.*	*Preſent Value of* 1 *l.*
1	0,9434	19	0,3305	37	0,1158
2	0,8900	20	0,3118	38	0,1092
3	0,8396	21	0,2941	39	0,1031
4	0,7921	22	0,2775	40	0,0972
5	0,7473	23	0,2618	45	0,0726
6	0,7050	24	0,2470	50	0,0543
7	0,6650	25	0,2330	55	0,0406
8	0,6274	26	0,2198	60	0,0503
9	0,5919	27	0,2074	65	0,0227
10	0,5584	28	0,1956	70	0,0169
11	0,5268	29	0,1845	75	0,0126
12	0,4970	30	0,1741	80	0,0094
13	0,4688	31	0,1643	85	0,0071
14	0,4423	32	0,1550	90	0,0053
15	0,4173	33	0,1462	95	0,0039
16	0,3936	34	0,1379	100	0,0029
17	0,3714	35	0,1301		
18	0,3503	36	0,1227		

It were needleſs to advertiſe, that the great Trouble of working ſo many Proportions will be very much alleviated by uſing *Logarithms*; and that inſtead of uſing *Nnv* — Yy^{v}, for the *ſecond Term* of the Proportion in finding the *Value* of 3 *Lives*, it may ſuffice to uſe only Yy^{v}, and then *deducting* the *fourth Term*, ſo found, out of the *third*, the *Remainder* ſhall be the *preſent Value* ſought: Or all theſe 4 *Terms* being *added* together, and *deducted* out of the *Value* of the *certain Annuity* for ſo many Years, will leave the *Value* of the *contingent Annuity* upon the *Chance* of *Mortality* of all thoſe 3 *Lives*. For Example: Let there be 3 *Lives* of 20, 30, and 40 *Years* of *Age* propoſed, and the Proportions will be thus:

As 661 *in* 531 *in* 445, *or* 156190995, *or* $N n''$,

to 8 *in* 8 *in* 9, *or* 576, *or* $Y y^{v}$, for the 1ſt *Year*; *ſo* 0,9434, *to* 0,00000348
to 15 *in* 16 *in* 18, *or* 4320, for the 2d *Year*; *ſo* 0,8900, *to* 0,00002462
to 21 *in* 24 *in* 28, *or* 14112, for the 3d *Year*; *ſo* 0,8396, *to* 0,00008128
to 27 *in* 32 *in* 38, for the 4th *Year*; *ſo* 0,7921, *to* 0,00016650
to 33 *in* 41 *in* 48, for the 5th *Year*; *ſo* 0,7473, *to* 0,00031071
to 39 *in* 50 *in* 58, for the 6th *Year*; *ſo* 0,7050, *to* 0,00051051

and ſo forth to the 60th *Year*, when we ſuppoſe the *elder Life*, of 40 *certainly* to be *expired*; from whence till 70, we muſt compute for the *firſt* and *ſecond* only; and from thence to 90, for the ſingle *youngeſt Life*. Then the *Sum Total* of all theſe 4 *Proportionals* being taken out of the *Value* of a *certain Annuity* for 90 *Years*, being 16,58 *Years Purchaſe*, ſhall leave the juſt *Value* to be paid for an *Annuity* during the *whole Term* of the *Lives* of 3 Perſons of the *Ages* propoſed. And *note*, that it will not be neceſſary to compute for every *Year ſingly*, but that in moſt Caſes every 4th or 5th *Year* may ſuffice, *interpoling* for the intermediate Years *ſecundum artem*.

It may be objected, that the different *Salubrity* of Places does hinder this Propoſal from being *univerſal*; nor can it be *denied*: But by the Number that die, being 1174 *per Annum* in 34,000, it does appear that about a 30th Part *die yearly*, as Sir *Will. Petty* has computed for *London*; and the Number that *die* in *Infancy*, is a good Argument that the *Air* is but indifferently *ſalubrious*. So that, by what I can learn, there cannot perhaps be one better Place propoſed for a *Standard*.

I have ſought if it were poſſible to find a *Theorem* that might be more conciſe than the *Rules* before laid down; but in vain: For all that can be done to expedite it is, by *Tables* of *Logarithms* ready computed to exhibit the *Rationes* of *N* to *Y*, in each *ſingle Life*, for every 3d, 4th, or 5th *Year* of *Age*, as Occaſion ſhall require; and theſe *Logarithms* being added to the *Logarithms* of the *preſent Value* of Money payable after ſo many *Years*, will give a *Series* of Numbers, the *Sum* of which will ſhew the *Value* of the *Annuity* ſought. However, for each Number of this *Series*, *two Logarithms* for a *ſingle Life*, 3 for 2 *Lives*, and 4 for 3 *Lives*, muſt neceſſarily be added together. *n.* 198. *p.* 654.

It may not perhaps be unacceptable to obſerve farther from theſe *Tables*, how unjuſtly we repine at the Shortneſs of our *Lives*, and think ourſelves wronged if we attain not *old Age*; whereas it appears hereby, that the one Half of thoſe that are *born* are *dead* in 17 *Years* time, 1238 being in that time reduced to 616. So that inſtead of murmuring at what we call an *untimely Death*, we ought to account it as a Bleſſing that we have ſurvived, perhaps by many Years, that *Period* of *Life*, whereat the one *Half* of the whole Race of *Mankind* does not arrive.

I ſhall alſo obſerve, that the *Growth* and *Increaſe* of *Mankind* is not ſo much *ſtinted* by any thing in the Nature of the *Species*, as it is from the cautious Difficulty moſt People make to adventure on the State of *Marriage*, from the Proſpect of the Trouble and Charge of providing for a *Family*. For by Computation from the *Table* I find, that there are nearly 15000 Perſons above 16, and under 45, of which at leaſt 7000 are *Women* capable to *bear Children*: Of theſe, notwithſtanding, there are but 1238 *born* yearly, which is but little more than a 6th Part. So that about one in 6 of theſe *Women* do *breed yearly*; whereas, were they *all married*, it would not appear ſtrange or unlikely, that 4 of 6 ſhould bring a *Child* every *Year*. The *political* Conſequences hereof I ſhall not inſiſt on; only the *Strength* and *Glory* of a *King* being in the *Multitude* of his *Subjects*, I ſhall hint, that above all Things *Celibacy* ought to be *diſcouraged*; as by extraordinary *Taxing*, and *military Service*; and thoſe who have *numerous Families* of *Children* to be countenanced and *encouraged*, by ſuch Laws as the *Jus trium Liberorum* among the *Romans*; but eſpecially by an effectual Care to provide for the Subſiſtence of the *Poor*, by finding them *Employments*, whereby they may earn their Bread, without being chargeable to the Publick.

Problems touching compound Intereſt *and* Annuities, *reſolved by Mr.* Adam Martindale, *with Explications; by Mr.* J. Collins, *Ph. Col. n.* 1. *p.* 34.

XXXV. *Twelve Problems* touching *Intereſt compound*, and *Annuities*, expreſſed in *Symbols*, to be reſolved by *Logarithms*, and diſtinguiſhed into three Ranks, whoſe *Symbols* are thus to be underſtood.

p	ſignifies	*Principal*	common to all the 3 *Ranks*.
r		*Rate*, viz. 1 *lib.* with its *Rate*	
t		*Time*	
a		*Amount* or *Aggregate*	proper to 1 *Rank*.
s		*Sum* of *Principal* and *Arrearages*	proper to 2 *Rank*.
d		*Difference* of *Principal* and *Worth*	proper to 3 *Rank*.

Their *Capitals* ſtand for the *Logarithms* of the Number ſignified by the *ſmall Letters*; *D*, ſignifies *Data*; *Q*, *Quæſitum*; *Prob. Problem*; *Reſ. Reſolution*.

The *firſt Rank*, touching *compound Intereſt* for a *ſingle Sum* of Money.

1 *Prob.* *D.* $p, r, t.$ *Q.* a? *Reſ.* $Rt. + P = A.$

2 *Prob.* *D.* $a, r, t.$ *Q.* p? *Reſ.* $A - Rt = P.$

3 *Prob.* *D.* $p, a, t.$ *Q.* r? *Reſ.* $\frac{A-P}{t} = R.$

4 *Prob.* *D.* $p, r, t.$ *Q.* t? *Reſ.* $\frac{A-P}{R} = t.$

The *ſecond Rank* concerning *Annuities* in *Arrear* at *compound Intereſt*, grounded upon theſe two *Axioms*.

1. *The* Annuity *and* Rate *of* Intereſt *being given*, *the* principal *Correſpondent to the* Annuity *is in effect given alſo*; *being eaſily found out by the* Rule of Three, *thus*;

As the Intereſt *of any* Principal (*Ex. gr.* of 1, 10, 100, *&c.*) *is to that* Principal; *ſo the* Annuity *or* Penſion, *to its* Principal.

2. *The* Sum *of the* Principal *and the* Arrearage *of all the Payments being found, the* Arrearages *alone may be obtained by* ſubtracting *the* Principal *from that* Sum.

The Problems *are theſe that follow.*

1 *Prob. D.* p, r, t. *Q.* s? *Reſ.* $Rt + P = S$.
2 *Prob. D.* s, r, t. *Q.* p? *Reſ.* $S - Rt = P$.
3 *Prob. D.* p, s, t. *Q.* r? *Reſ.* $\frac{S - P}{t} = R$.
4 *Prob. D.* p, s, r. *Q.* t? *Reſ.* $\frac{S - P}{R} = t$.

The *third Rank*, touching *Annuities anticipated*, or bought for a *Sum in hand* (or equivalent thereto) at *compound Intereſt diſcounted*, bottomed upon the former of the *two Axioms* above-mentioned, and this that followeth;

If the Difference *and* Worth *be once found, the* Worth *is eaſily obtained, by* ſubtracting *that* Difference *out of the* Principal, *which is ever greater, being the* Worth *of the* Annuity *at that* Rate *for ever*.

1 *Prob. D.* p, r, t. *Q.* d? *Reſ.* $P - Rt = D$.
2 *Prob. D.* d, r, t. *Q.* p? *Reſ.* $D + Rt = P$.
3 *Prob. D.* p, d, t. *Q.* r? *Reſ.* $\frac{P - D}{t} = R$.
4 *Prob. D.* p, d, r. *Q.* t? *Reſ.* $\frac{P - D}{R} = t$.

XXXVI. There are 2 *Lotteries*, at either of which a *Gameſter* paying a *Shilling* for a *Lot*, or Throw, the *firſt Lottery* upon a juſt Computation of the *Odds* has 3 to *one* of the *Gameſter*, the *ſecond Lottery* but 2 to 1: Nevertheleſs the *Gameſter* has the very ſame Diſadvantage (and no more) in playing at the *firſt Lottery* as the *ſecond*.

An arithmetical Paradox *concerning the* Chances *of* Lotteries; *by Mr.* Fr. Roberts. *n.* 198. *p.* 677.

It looks very like a Contradiction, that the Diſadvantage ſhould be no greater in playing againſt 3 to 1, than 2 to 1; but it may thus be reſolved.

Let the $\left\{\begin{matrix}\text{1ſt}\\ \text{2d}\end{matrix}\right\}$ *Lottery* conſiſt of $\left\{\begin{matrix}3\\ 4\end{matrix}\right\}$ *Blanks* and $\left\{\begin{matrix}3\\ 2\end{matrix}\right\}$ *Prizes* of $\left\{\begin{matrix}\text{16 } \textit{Pence}\\ \text{2 } \textit{Shill.}\end{matrix}\right\}$ apiece.

In the *firſt Lottery* the *Gameſter* hazards a *Shilling* to win a *Groat*; and the *Changes* being equal, it is evident there are 3 to 1 againſt him.

In the *ſecond Lottery* the *Gameſter* ventures a *Shilling* againſt a *Shilling*; and the *Lots* being 4 to 2, his Diſadvantage is *two to one*.

And yet a *Lot* at either of them being truly juſt worth 8 *Pence* (*viz.* the 6th Part of 3 times 16 *Pence*, or twice 2 *Shillings*), the Diſadvantage muſt be the very ſame in both Caſes; that is, the *Gameſter* pays a *Shilling* for a *Lot* that is worth but 8 *Pence*.

The Method of finding this Anſwer being ſomewhat out of the common Road, I ſhall here add it; and thereby infinite Solutions on the ſame Kind may be diſcovered.

1ſt Lottery.
Let a = the Number of *Blanks*.
b = the Number of *Prizes*.
r = the Value of a *Prize*.
1 = to what you pay for a *Lot*; *viz.* a *Shilling*.

2d Lottery.
m = the Number of *Blanks*.
n = the Number of *Prizes*.
s = the Value of a *Prize*.

So the *Lottery* has its *Chances* for 1, and the *Gameſter* his for $r-1$. Now the true *Odds* conſiſting of the compounded Proportion of the *Chances* and the *Values*; viz. $\frac{a}{b}$ and $\frac{1}{r-1}$, the Share of the *Lottery* will be a, and that of the *Gameſter* $rb-b$. Therefore, as the preſent Caſe ſtands, the *firſt Lottery* muſt be, $a = 3rb -$; and, by the like Reaſoning, the *ſecond Lottery* will be $m = 2sn - 2n$. Now the Value of a *Lot* being the Sum of the *Prizes* divided by the Number of *Lots* (which muſt be equal in both *Lotteries*), it yields $\frac{rb}{a+b} = \frac{sn}{m+n}$. So to proceed,

$\left.\begin{matrix}a\\b\\r\\m\\n\\s\\q\end{matrix}\right\}=?$	1	$a = 3rb - 3b$
	2	$m = 2sn - 2n$
	3	$\frac{rb}{a\times b} = \frac{sn}{m\times n}$
	4	(*)
	5	(*)
	6	(*)
	7	Let $\frac{a+b}{rb} = q$
$7\times\overline{a+b}$	8	$rb = qa + qb$
8×3	9	$3rb = 3qa + 3qb$
$1 + 3b$	10	$3rb = a + 3b$
9, 10	11	$3qa + 3qb = a + 3b$
Scope	12	If $a = 0$, to avoid *negative* Numbers
11, 12	13	$3b = 3qb$
$13 \div 3b$	14	$q = 1$
12, 14	15	$q > 1$, makes $a < 0$; $q < 1$, makes $a > 0$
Scope	16	If $b = 0$
11, 16	17	$3qa = a$
$17 \div 3a$	18	$q = \frac{1}{3}$
16, 18,	19	$q < \frac{1}{3}$, makes $b < 0$; $q > \frac{1}{3}$ makes $b > 0$

3, 7	20	$\frac{sn}{m+n} = q$
20 × mn	21	$sn = qm + qn$
21 × 2	22	$2sn = 2qm + 2qn$
2 + 2n	23	$2sn = m + 2n$
22, 23	24	$2qm + 2qn = m + 2n$
Scope	25	If $m = 0$
24, 25	26	$2qn = 2n$
26 ÷ 2n	27	$q = 1$
25, 27	28	$q > 1$ makes $m < 0$, $q < 1$ makes $m < 0$
Scope	29	If $n = 0$
24, 29	30	$2qm = m$
30 ÷ 2m	31	$q = \frac{1}{2}$
29, 31	32	$q < \frac{1}{2}$ makes $n < 0$; $q > \frac{1}{2}$ makes $n > 0$
15, 19, 28, 32	33	that $abmn$ may be > 0, q muſt be $> \frac{1}{2} < 1$
33, 4 (*)	34	Let therefore $q = \frac{2}{3}$
7, 34	35	$\frac{rb}{a+b} = \frac{2}{3}$
35 ×, 10	36	$3rb = 2a + 2b = a + 3b$
36 —	37	$a = b$
20, 34	38	$\frac{sn}{m+n} = \frac{2}{3}$
38 ×	39	$3sn = 2m + 2n$
39 × 2	40	$6sn = 4m + 4n$
23 × 3	41	$6sn = 3m + 6n$
40, 41	42	$4m + 4n = 3m + 6n$
42 —	43	$m = 2n$
1 ÷ 37	44	$1 = 3r - 3$
44 + 3	45	$3r = 4$
2 ÷ n, 43	46	$2 = 2s - 2$
46 + 2	47	$2s = 4$
5 (*)	48	Let $A = 3$
37, 48	49	$B - 3$
45 ÷ 3	50	$R = \frac{4}{3}$, *i. e.* 16 *Pence*
6 (*)	51	Let $M = 4$
43, 51	52	$N = 2$
47 ÷ 2	53	$S = 2$, *i.e.* 2 *Shillings.*

XXXVII. *Papers* overlook'd *till it was too late to inſert them in their proper Places.*

A diſeaſed Kidney; *by* S. Malpighi. *n.* 160. *p.* 607. Vid. *Vol.* III. *Part* I. *Chap.* IV. *Sect.* LIII.

1. Monſtroſum aliquid, in Illuſtriſſimi Juvenis *Antonii Franciſci Daviæ*, Excelſi *Antianorum* Conſulis, Cadavere obſervatum, non parum exaratam a me *Renum* Structuram illuſtrat. Hujus *Ren* Siniſter, exiguus mole, exterius quaſi Congeriem & Racemum Uvæ Albæ exhibebat, multiplicibus ſcilicet Glanduloſis Folliculis, veluti tot exiguis Botris congeſtus: Hi Inſignibus *Excretoriis* vaſis, quibus de more *Renum* caro excitatur, haud donabantur, ſed immediate expanſo *Pelvi*, vel ſaltem breviſſimo Ductu, nectebantur. *Venæ* & *Arteriæ* ſingula irrigabant, & *Ureter* è *Pelvi* producebatur. *Ren* Dexter mole longe major erat, & exterius inſignes *Glandulæ*, quaſi *Veſiculæ* Urina turgidæ, erumpebant. Congeries quoque *Excretoriorum* Vaſorum, quibus *Renum* caro conflatur, amplior & latior ſolito erat, & appenſæ *Glandulæ* Amplæ quaſi *Veſiculæ* interſerebantur. Harum aliquæ Corrupto & Subnigricante *Sanguine* ſcatebant, reliquæ *Urina* turgebant, vel Arenulis Tartareaque Materia referebantur. Ex hac itaque *Renum*, licet Monſtroſa, ſed Simplici Structura, evidenter patet, præcipuas *Renum* partes, præter *Arterias* & *Venas*, *Glandulas* eſſe, & *Pelvim*, qui in *Ureteres* productus in *Glandulis Lotium* per *Excretoria* Vaſa recipit, & ſenſim in *Veſicam* derivat. Turgebant autem *Glandulæ*, & Monſtroſa deformabantur Specie, quia impedita *Excrementi* expulſione in *Pelvim*, neceſſario ſtagnante intus *Urina* laxabatur *Glanduloſa* Compages, & in aliquibus etiam loco *Seri* Rubicunda *Sanguinis* portio continebatur; impedito ſcilicet per *Venas* regreſſu, vel lacerato ſeparationis Organo. Hoc idem in reliquis *Glandulis* accidit vi Morbi, & præcipue in *Jecore*, in quo vigente *Cachexia* non raro ipſius *Glanduloſi Acini* turgente *Bile*, quandoque *Sero* aut *Tartaro*, in ampliorem ita extenduntur formam, ut *Veſiculas* æmulentur. Simpliciſſima quoque *Glandularum* ſtructura, in pluribus Partibus obſervata, totum confirmat; nam in Labiis *Bovum*, in *Hominis* Facie, circa *Penis Glandem*, in *Inteſtinis*, & in *Muſculorum* Spaciis Minimæ Simpliceſque locantur *Glandulæ*, quæ nil aliud ſunt, quam Rotundi, interdum Ovales, & non raro Oblongi, folliculi *Excretorio* Vaſi continuati, & appenſi, quorum varia Structura Diverſi ſeparantur *Humores* & *Succi*.

The Phoſphorus Metallorum; *by Sir* Rob. Southwell. *n.* 245. *p.* 365. Vide *Vol.* III. *Part* I. *Chap.* IX. *Sect.* XI.

2. Take *Lapis Smaragdi Mineralis* (ſuch as is found in the Mines of *Saxony*), and beat it into a very fine Powder: If you ſtrew this very fine on any *Metal*, and in any Figure, and ſet the Plate on any *hot Coals*, in a ſhort time you will perceive in the Dark a *Light* to ſhine, which will (ſaith my Author) laſt as long as you continue the *hot Coals*: And if you beat out the Fire, it may do again for once or twice; but then the Virtue will fade.

The Texture of Ivory; *by Dr.* Neh. Grew. *n.* 141. *p.* 1003. *Fig.* 83.

3. I have often taken Notice of the *Grain* of *Ivory*, which upon a due Poſition to the falling Light is viſible to a naked Eye; the ſeveral Pieces, whereof it is compoſed, appearing like the *Fibres* of a *Muſcle*, running in Parcels, *decuſſatim*, and under and over one another reciprocally, and ſo making up one Piece of *platted Work*.

XXXVIII. *Papers of leſs general Uſe, omitted.*

1. A Relation of the Advice given by M. *Petit*, touching the *Conjunction* of the *Ocean* and *Mediterranean*; by M . . . . . . *n. 5. p. 41.*

2. A Narrative of the *Conjunction* of the *Ocean* and *Mediterranean*, by the Contrivance and Management of M. *Riquet*; together with a *Map* of the ſaid *Channel*; by M . . . . . . *n. 56. p. 1123.*

3. Additions to the foregoing *Narrative*; in which the Progreſs and deſigned *Uſefulneſs* of that *great Undertaking* are more amply repreſented; by M. *De Froidour*. *n. 84. p. 4080.*

4. Divers *Rural* and *Oeconomical Inquiries*; by . . . . . . *n. 111. p. 240.*

5. An Account of ſome of Dr. *Elſholt*'s curious and uſeful *Experiments*; communicated from *Berlin* to Mr. *T. H.* *Ph. Col. n. 4. p. 104.*

6. A miſcellaneous *Catalogue* of mean, vulgar, cheap, and ſimple *Experiments*; by Sir *Will. Petty*. *n. 167. p. 849.*

7. A *Regiſter* of the *Price* of *Corn*, *Births* and *Burials*, Quantity of *Rain*, *Earthquakes*, *Inundations*, and *remarkable Fatalities*, ſolicited by Dr. *J. Beale*. *n. 90. p. 5141.*

XXXIX. *Letters and other Papers by M.* Ant. Van Leewenhoeck, *omitted.*

1. A Specimen of ſome Obſervations made by a *Microſcope* lately invented by M. *Leewenhoeck*, concerning *Mould* upon *Skin*, *Fleſh*, and other Things; the *Sting* of a *Bee*; the *Head* and *Eyes* of a *Bee*, and a *Louſe*. *n. 94. p. 6037. n. 97. p. 6116.*

2. Conſiderations touching the *Compreſſion* of *Air*. *n. 102. p. 21.*

3. *Microſcopical* Obſervations upon *Blood*, *Milk*, *Hair*, *Nails*, and the *internal Parts* of a *Louſe*, and her Manner of *Feeding*. *n. 102. p. 23.*

4. *Microſcopical* Obſervations concerning *Blood*, *Bone*, the *Liver*, *Brain*, *Spinal Marrow*, *Fleſh*, *Spittle*, and the *Cuticula*; alſo upon *Sweat*, *Wool*, *Hair*, *Blood*, *earthy Particles* in the *Air*, *Fat*, and *Tears*. *n. 106. p. 121. ibid. p. 122.*

5. *Microſcopical* Obſervations upon the *Eye*, the *Optick Nerve*, and other *Nerves*; upon *Salt*, *Yellow Earth* from *England*, *Flemiſh Earth*, *Clay*, and a *Green Cloud* in *Water* and the *Animalcula* in it. *n. 108. p. 178.*

6. *Microſcopical* Obſervations concerning the *Optick Nerve*; alſo about the *Texture* of the *Blood*, the *Sap* of ſome *Plants*, the *Figures* of *Salt* and *Sugar*, and the probable Cauſe of the *Difference* of their *Taſte*; and the *Figure* and *Operation* of *Manna*. *n. 117. p. 378, & 380.*

7. Obſervations concerning the *Texture* of *Trees*; *compared with what has been writ upon that Subject by Dr.* Grew *and* S. Malpighi: Alſo concerning *Animalcles* in *Wine*. *n. 127. p. 653.*

8. *Animalcles* diſcovered in *Rain-Water*, *River-Water*, *Well-Water*, *Sea-Water*, and in *Water* wherein *Pepper* had been infuſed. *n. 133. p. 821.*

9. The Manner of *obſerving* and *numbering* the *Animaleles* in *Water*. *n. 134. p. 844.*

n. 136. p. 899. 10. Obſervations on the *carneous Fibres* of a *Muſcle*, the *Pia Mater* and the *Brain*, the *ſpinal Marrow*, *Moxa*, *Cotton*, and the *Roughneſs* within the *Shell* of a *Cheſnut*.

n. 140. p. 1002. 11. *Microſcopical* Obſervations of the *Structure* of *Teeth* and other *Bones*, and of *Hair*.

n. 142. p. 1040. 12. A Letter to my Lord *Brouncker*, *De Natis è Semine Maſculo Animalculis*; anſwered by Dr. *Grew*; the Obſervations further proſecuted by the Author; and Dr. *Grew*'s Opinion *de* Vaſis *in Craſſa Seminis Materia Obſervatis*.

Ph. Col. n. 1. *p.* 3. 13. *Animalcles* diſcovered in the *Melt* of a *live Cod-fiſh* and *Pikes*; in the *Vaſa Deferentia* of a *Male Hare*, and of *Birds*; and in the *Teſticles* of a *Dog*, and a *Cock*.

Ph. Col. n. 3. *p.* 51. 14. *Microſcopical* Obſervations on *Lees of Wine*, *Blood*, *Fermenting Syrups*, *Water*, the *Liquor* in the *Venæ Lacteæ*, the *Chyle*, *Milk*, *Urine*, the *Watery Parts* of the *Air*; the *Semen Maſculum* of *Inſects*; *Pepper-Water*; together with his Method of *calculating* the *Minuteneſs* of the *Animalcles*.

Ph. Col. n. 4. *p.* 93. 15. The *Structure* of *Hair*, and its Manner of *growing*; the *Excrements* of *Men* and other *Animals*; and the *Particles* of *Clay*.

Ph. Col. n. 5. *p.* 252. 16. The Texture of the *Muſcles* of *Quadrupeds* and *Fiſh*; the Growth of *Hair*; the *Blood* of *Fiſh*; the *Fins* of *Oyſters*; and the *Production* of *Oyſter-Shells*.

Ph. Col. n. 7. *p.* 188. 17. The Texture of the *Muſcular Fleſh* of *Lobſters* and *Prawns*.

n. 145. p. 74. 18. The *Generation* of Animals *ab Animalculo*, and not *ex Ovo*; the Parts and *Generation* of *Fleas*; the *Fleſh* of a *Louſe*; the *Fleſh* and *Feathers* of a *Gnat*; *Sal Volatile Oleoſum* mixed with *Blood*; no *Air-bubbles* in *Blood*.

n. 148. p. 197. 19. The *Texture* of ſeveral Sorts of *Trees*, and their *five* Sorts of *Veſſels*; *Animalcles* in the *Melts* of *Fiſh*.

n. 152. p. 347. 20. The *Generation* of Animals *ab Animalculo in Semine Maſculo*, particularly of *Frogs* and *Fiſh*; the *Veſſels* and *Muſcles* of a *Frog*; *Digeſtion* by the *Motion* of the *Stomach*; *Circulation* of the *Blood*; and the *Cauſe* of *Fevers*.

n. 159 p. 568. n. 197. p. 646. 21. *Animalcles* in *Spittle*; in the *Scurf* of the *Teeth*; the ſuppoſed *Worms* in the *Skin*; and the *Scales* upon the *Skin*.

n. 160. p. 586. 22. The *Cuticula* of the *Mouth* and *Lips* covered with *Scales*; the Reaſon of the *Tickling* by a *Hair* lying upon the *Skin*; a *ſcaly Child*; the *Slime* within the *Guts*; the *Lacteal* and *Lymphatick Veſſels*; and the Uſe of the *Slime* within the *Guts*.

n. 165. p. 780. 23. The *Cryſtalline Humour* of the *Eye*; the Uſe of the *Eye-lids*; and the *red Particles* of *Blood*.

n. 168. p. 883. 24. The *Brain* of ſeveral *Animals*; the *Cryſtalline Humour* of an *Human Eye*; *Moxa*, and other *downy* Subſtances; the *Chalk-Stones* of the *Gout*; the *Leproſy*, and the *Scales* of *Eels*.

25. The *Salts* of *Vinegar*; *Crabs-Eyes* and *Chalk* diſſolved in *Vinegar*; the *Particles* of *Water*; the *Salts* of ſeveral Sorts of *Wine*; *Tartar*, *Crabs-Eyes*, and *Chalk*, diſſolved in *Wine*. *n.* 170. *p.* 963.

26. The *Salt* of *Carduus Benedictus*; *Salt* of *Wormwood*; *Alum*; *Saltpetre*; *Blue Vitriol* of *Cyprus*; *Oil* of *Tartar per Deliquium*; *Muſcovy Pot-Aſhes*; *Camphire*; *Salt* of the *Aſhes* out of an *Iron Foundery*; *Salt* of the *Aſhes* of a *Tin* or *Lead Oven*; *Salt* in *Quick-lime* and in *Lime* of *Fiſh-Shells*; *Salt* of *Engliſh Soda*, and of the *Soda* of *Britany* and *Alicant*; and *Sal Ammoniac*. *n.* 173. *p.* 1073.

27. The *Generation* of *Animals ab Animalculis in Semine Maſculo*; the *Semen Maſculum* found in the *Uterus*; and the *Propagation* of *Plants*. *n.* 170. *p.* 979. *n.* 173. *p.* 1090.

28. *Animalcles* in the *Teſticles* of a *Rat*; in the *Seed* of *Muſcles*; in *Oyſters*; and in the *Sap* of *Vines*. *n.* 174. *p.* 1120. *n.* 196. *p.* 593.

29. The *Seeds* of *Aſh*; the *Propagation* of *Plants* and *Animals*; the *Seeds* of *Willow*, and of *Elm*, and ſome other *Vegetables*. *n.* 199. *p.* 700.

30. *Native Cinnabar*, *Brimſtone*, *Gunpowder*, and *Nitre*. *Air* generated by the *firing of Gunpowder* in cloſe Glaſſes, and by the Infuſion of *Crabs-Eyes* in *Vinegar*. *n.* 200. *p.* 754.

31. The Texture of *Bones*; the *Bark* of *Trees*; the *Skin* of *Animals*; the *Pores* of the *Skin*, and *Perſpiration*. *n.* 202. *p.* 838.

32. The *Seed* of *Cotton*; *Eggs* of *Inſects*; *Date-Stones*; *Mother-Cloves*, and the Manner of *curing* them in *India*; and *Nutmegs*. The *Seeds* of *Gooſeberries*, of *Black Currants*, of *Tulips*, of *Caſſia*, of the *Olive*, and of the *Lime-Tree*. *Sweat*, the *Pores* of the *Hands*, the *Cryſtalline Humour* of the *Eye*, and the *Optick Nerve*. The *Gall* of a *Trout*; the Skin of an *Eel*, and the *Scales* and *Slime* upon it; the *Slime* and *Scales* upon *Bream*, and upon *Perch*; *Beer-Vinegar*; *Juice* of *Lemons*; *Spirit* of *Sal Ammoniac*; and *Sal Volatile Oleoſum*. *n.* 205. *p.* 949.

33. The *Generation* of an *Inſect* called a *Wolf*, and a Way to *deſtroy* them; *Inſects* upon the Walls of a *Granary*; *Animalcles* in *Water*; the *Inſects* bred in *Apples*; and *Cheeſe-Maggots*. *n.* 213. *p.* 194.

34. The *Growth* and *Goodneſs* of *Timber*. *n.* 213 *p.* 224.

35. The *Generation* of *Eels*; the *Circulation* of the *Blood* viſible in *Eels*; *Mites* in *French Barley*, and in *Figs*; the *Seeds* of *Figs*; the *Seeds* of *Strawberries*, and the *Hair* of the *Feet* of *Norway Lobſters*. *n.* 221. *p.* 269.

36. Several *Magnetical Experiments*; the *Concave Surface* of *Liquors* in Glaſſes; and a Relation of a *German* who pretends to *cure Diſeaſes* by *Sympathy*. *n.* 227. *p.* 512.

37. Obſervations concerning the *Production* of *Vegetables*; the *Eggs* of *Snails* and their *Young*; *Animalcles* in the *Scurf* of the *Teeth*; and *young Oyſters*. *n.* 235. *p.* 790.

38. The *Eyes* of *Beetles* and their *Optick Nerves*, and of *Gnats*. *n.* 240. *p.* 169.

39. *Objections to M.* Leewenhoeck's *Hypotheſis of the Generation of Animals from the* Animalcula in Semine Maſculino, *by Dr.* Liſter. *n.* 222. *p.* 326. *n.* 244. *p.* 337.

n.255.p.270. 40. M. *Leewenhoeck*'s Anſwer to Dr. *Liſter*'s *Objections.*

n.255.p.301. 41. Obſervations concerning [the *Animalcula in Semine Humano, Microſcopes,* and the beſt Method of *viewing* the *Animalcles.*

n.260.p.447. 42. *Tadpoles*; and the *Circulation* and *Stagnation* of the *Blood* in them.

n.261.p.509. 43. The *Worms* in the *Livers* of *Sheep*; the *Generation* of *Gnats*; *round moving Particles* in *Water*; the *Circulation* of the *Blood* in *Frogs*; the *Excrement* of *Frogs*, and *Animalcles* in it.

n.263.p.552. 44. The *Circulation* of the *Blood* in *Bats*; the *red Globules* of *Blood*; the *Union* of the *Blood Veſſels*; and the *Animalcles* in the *Semen* of *Cocks.*

n.265.p.635. 45. *Cheeſe-Worms*, and *Worms* taken out of an *hollow Tooth.* Such *Worms* perhaps the *Cauſe* of the *Tooth-Ach.*

n.266.p.640. 46. *Cheeſe-Worms* changed into *Flies*, and *Worms* taken out of an *hollow Tooth* of the ſame Kind.

n.265.p.659. 47. Two Sorts of *Inſects* upon *Fruit-Trees*, and their *Generation.*

XL. *Accounts of Books omitted.*

n.187.p.329. 1. A Continuation of the *new Digeſter of Bones*, and the new *Uſes* it hath been applied to, both at Sea and Land; together with ſome Improvements and new Uſes of the *Air-Pump*, tried both in *England* and *Italy.* By *D. Papin*, M.D.

n.37.p.740. 2. La *Venerie Royale*; du Sieur de *Salnove à Paris*, in 4*to.*

n.119.p.461. 3. The *Gentleman's Recreation*, in four Parts; viz. *Hunting*, *Hawking*, *Fowling*, *Fiſhing*. *Lond.* 1674. in 8*vo.*

n.143.p.21. 4. Obſervations upon the *Dublin Bills* of *Mortality*, 1681. and the State of that City. By Sir *Will. Petty*, *Lond.* 1683.

n.183.p.152. n.185.p.237. 5. Two Eſſays in *Political Arithmetick* concerning the comparative *Magnitude*, *Riches*, &c. of *London* and *Paris*; by Sir *Will. Petty.* *To which is here added an Anſwer to the Objections made by the* Author *of the* Nouvelles de la Republique des Lettres; *and to thoſe by M.* Azout: *Where 'tis computed that the* Number *of the* People *in* London *is* 695,718; *in* Paris 494,555; *in* Rouen 80,000; *in* Rome 125,000.

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